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# THE MORPHINE-HYOSCINE METHOD OF PAINLESS CHILDBIRTH.

## *OR SO-CALLED "TWILIGHT SLEEP."*

BY

F. W. N. HAULTAIN, M.D., F.R.C.P.E.,

AND

BRIAN H. SWIFT, B.A., M.B.CANTAB.

[From the Royal Maternity Hospital, Edinburgh.]

LAST year a popular work, entitled *Painless Childbirth in Twilight Sleep*, was published by a lay author. In it a careful and excellent summary was given by various experts; it included also a somewhat amusing personal interview with a prominent British obstetrician, who not only gave the treatment unqualified commendation, but also in the form of a letter added a benediction to the value of the methods employed.

As is natural to expect with such testimony, the subject has been energetically exploited by women interested, who in some cases merely desire to know its real value, but in other instances uncompromisingly demand its adoption in their confinement. Having the Maternity Hospital clinic at our disposal, we felt we might be able to give an opinion from actual practical experience, and perhaps help others who are less fortunately placed in the way of gaining experience, but who are equally subjected to popular demands.

In the first instance, it should be clearly understood that there is a vast difference between the true so-called "twilight sleep," as devised and carried out by Kronig and Gauss, and the ordinary haphazard scopolamine-morphine treatment which has been freely practised by many of us for the last eight years. In the former a complete analgesia and amnesia is the object aimed at in the conduct of labour, so that the patient becomes absolutely free from any knowledge of pain, or indeed of any recollection of the process having occurred. It will be useful, therefore, first to give a brief outline of the technique.

As soon as the pains begin the patient is put in a quiet and darkened room, and plugs of cotton-wool are put in her ears. When the pains occur regularly every five or six minutes and the os is of a size sufficient to admit two fingers the initial dose is given. This consists in the hypodermic injection of morphine hydrochloride gr. $\frac{1}{4}$ with hyoscine hydrobromide gr. $\frac{1}{150}$. The patient usually rapidly begins to feel drowsy, and in an hour may fall off to sleep but awakes when the pains come on. The second injection of hyoscine gr. $\frac{1}{150}$, is usually given at the end of an hour. Half an hour later the patient's memory is tested by showing her some object and then allowing her to sleep. Sometime afterwards the same object is shown her again, the patient being awakened. If she recognizes the object as one that was shown her before, another dose of hyoscine gr. $\frac{1}{150}$ is called for; if, however, she does not recognize the object and says it had not been shown her before, then the depth of desired unconsciousness has been obtained. This memory test is repeated later, and, if necessary, similar doses of hyoscine may be required. The patient usually sleeps between the pains, but generally is conscious during them. She does not, however, fully appreciate the pains as such, and, if asked about them, generally describes them otherwise.

The child is usually born normally, and, after the birth of the placenta, the patient falls into a normal sleep for four to six hours and awakes quite fresh. During the labour she should be catheterized. This is most important, especially in long labours. Patients very often complain of thirst, and in such cases should have water to drink.

Kronig lays stress on what he calls islets of memory. For instance, the patient whilst coming out of the narcosis may hear some noise or see some action which arouses her and may remain in her brain, so that she will remember it, and after the labour will build up her ideas of the labour from this one fact. Thus, the baby should be removed to another room, so as to avoid the mother hearing the child cry and so forming an islet of memory.

The morphine-hyoscine method has been extensively used in America, especially since the beginning of 1914. Hellman has discussed the work done, and has shown that when the Kronig technique was used the results had been excellent.

In the British Isles this method had not been used so extensively. Kronig's technique had not been adhered to, and most observers have not given repeated doses, but usually one or two doses, in order to lessen the pain. In 1908 Buist published a paper on "Scopolamine-morphine in natural labour." He did not repeat the injections of hyoscine in any number, but seemed rather to give the morphine and hyoscine simply so far as to alleviate the distress of the patient. He summarizes his treatment as follows: "Whenever your patient is distressed by the pains and you expect the labour to last more than an hour, give an injection of hyoscine and morphine; and if you expect it to last a considerable time, repeat the injections, if necessary, in three or four hours." From this it may be inferred that Buist did not try for true "twilight sleep," but rather an alleviation of the pain in distressing cases.

In 1907 Croom published a paper on the subject, and quoted 65 cases. In his cases, however, the injections were always given late in the second stage, when the pains were very severe. This is not the true so-called twilight sleep of Kronig. He seldom found it necessary to repeat the dose, and does not mention repeating the injections with hyoscine alone. In 1915 Croom published another paper, in which he advised the injections to be given at the beginning of the second stage. The repetition of the initial dose, and not of pure hyoscine, also differs from Kronig's technique. Perhaps the greatest advantage of Kronig's method is that the patient is relieved of suffering through a tedious first stage.

In 1911 Giuseppi published a paper in the *Practitioner*, and gave his results based on a series of 37 cases. As the initial dose in most of his cases he used morphine gr. $\frac{1}{4}$, hyoscine gr. $\frac{1}{150}$. This initial injection was given when he considered the amount of pain complained of was sufficient. He did not use the size of the os as a guide. To use his own words, he says, "The time for the administration of the first dose was therefore decided not by the state of the os or by the frequency of the pains, but by the amount of suffering." He never repeated the morphine, and in 16 cases the hyoscine was repeated once only. He did not seem to lay much stress on amnesia, but gauged his results rather from the amount of pain. Thus in 16 per cent. no pain was felt; in 27 per cent. very little pain was felt; in 37 per cent. pain was decreased, and in 19 per cent. pain was felt as usual. It is very difficult, of course, to compare the degrees of pain in the cases of various observers.

Giuseppi goes on to state that in seven cases the mothers did not know of the birth of their children. As this is really the true amnesia, the percentage of true "twilight sleep," therefore, was very low. This was most probably because he did not repeat the hyoscine, and so the narcosis obtained was not deep enough for true amnesia.

In our cases the Kronig technique was rigidly adhered to in the first eight cases, the memory test always being applied, and the results were highly satisfactory. After this, however, less stress was laid on the memory test. We found that it was most useful for the first two or three injections, but that when once the patient had lost her memory it was quite satisfactory and safe to continue the injections of hyoscine gr. $\frac{1}{150}$ at regular intervals of one hour. It was also noticed that after several cases had been treated with this method one learnt to judge from the patient's general appearance whether another injection was required or not. The method of giving the hyoscine every hour relieves the physician of much trouble, as nurses can simply be directed to give an injection at such specified times.

There is, however, a chance of the patient becoming restless, which, according to Kronig, is due to faulty dosage, or to over-dosage. The pharmacology of hyoscine —or scopolamine as it is sometimes called—is not very definite, but Cushny quotes that "Hyoscine in large doses sometimes gives rise to delirium and excitement resembling the delirium caused by atropine."

Whether this restlessness in the case of "twilight sleep" is due to over-dosage or not, is difficult to say. In quite a number of cases over twenty injections of hyoscine were given without the slightest ill effect. In one case only was there very marked restlessness. In this case the patient began to be restless after the third injection, which seems to put over-dosage of hyoscine out of the question. In one case forty-five injections were given without the least sign of restlessness. This was the greatest number of injections

given in any one case, and shows that hyoscine is not so dangerous as it is supposed to be. Restlessness, therefore, is probably an idiosyncrasy of the patient to the drug. Before these investigations the greatest number of injections in any one case was twenty-two; and Hellman warned that more than this might be harmful. However, in several cases we have given more injections without any ill effects to mother or child.

As it is impossible in hospital to isolate each case in a separate room, it was found that by darkening the room and placing a screen round the patient, whose ears were plugged with cotton-wool, the desired result was obtained. As soon as the patient's memory was gone, injections were given at the fixed interval, usually at intervals of three-quarters of an hour or an hour, according as the patient appeared to be deeply under or not. The second dose was usually given three quarters of an hour after the initial dose of the morphine and hyoscine. In one case, however, the first injection had such a marked effect that the second was not necessary for four hours; on the other hand, if the time before the second injection is given is too long, the morphine will have worn off and the hyoscine will not take effect.

There were in all 40 cases taken consecutively—36 primiparas and 4 multiparas—and with the above technique of regular injections the results were excellent. The initial injections were given early in the first stage, if possible.

### *Dosage.*

The initial dose was, in 36 cases, morphine gr. $\frac{1}{4}$, hyoscine gr. $\frac{1}{150}$; in 3 cases, morphine gr. $\frac{1}{6}$, hyoscine gr. $\frac{1}{150}$. The results of these three cases were: One case total amnesia, one case slight amnesia, and one case no amnesia. In these two last cases there was marked analgesia. It seems, therefore, that, although this smaller dose of morphine will do quite well in some cases, the larger dose is to be preferred. In the other case the initial dose was hyoscine gr. $\frac{1}{150}$ alone. This was given in order to see if it would ease the pain in any way. The hyoscine was repeated twice in doses of gr. $\frac{1}{150}$, but without any effect at all. Morphine gr. $\frac{1}{4}$ was then given, and the case became one of normal "twilight sleep." The reason for trying this method was that in one case the injection of the initial dose of morphine and hyoscine stopped the pains. This is apt to be so if it is given very early before the pains are quite regular, which rather helps to prove that the morphine has some effect in diminishing the strength of the pains.

In three cases the morphine was repeated. One case was a very long labour, in which, after the first twelve injections of hyoscine, the patient began to recover consciousness, so that morphine gr. $\frac{1}{8}$ was given. This had a beneficial effect, and the patient passed well under narcosis again. The second case was also one of a long labour; the pains at one period stopped altogether, and did not start again for twelve hours, and then were not very good. The child in this case was slightly oligopnoeic. The remaining case was one in which the pains seemed to be stopped by the initial injections, although strong before. The pains returned in ten hours, when the morphine was given again. The baby was slightly oligopnoeic. The labour was completely amnesic.

The smallest number of injections by which amnesia was obtained was four, including the initial dose, and the greatest number forty-five, including two doses of morphine. The average number of hyoscine injections per case was eleven; this is in the total number of cases. In the thirty cases in which the results were perfect, the average number was twelve injections.

### *Results.*

Total amnesia and analgesia were obtained in 30 out of 40 cases—namely, 75 per cent. This means that the patient had no memory whatever of the labour after the first pin-prick, and so, being unable to remember anything, says she had no pain. The patient, however, may have complained during the labour of something, but has not appreciated the something as pain. The other cases varied from slight amnesia 13 per cent. to no amnesia 12 per cent. It was found that in practically every case there was at least slight analgesia. However, three cases were in some degree practically failures. In one treatment was started very late—namely, when the os was fully dilated, and the injections seemed to have no effect. In another the patient was a primipara of 42 with a very long and painful first stage.

It is interesting to compare these results with those of Hellman, whose are the latest published. His results were obtained at the Lebanon Hospital, New York.

| | Our Cases. | Hellman. |
|---|---|---|
| Amnesia ... ... ... | 75.0% | 67.95% |
| Slight amnesia ... ... | 13.0% | 13.59% |
| No amnesia ... ... | 12.0% | 18.12% |

### *Complications.*

*Restlessness.*—In one case only was there marked restlessness so that the injections had to be stopped, but the mother had no recollection of having been restless. This was the second case on which the method was used, so the defect may have been due to lack of knowledge or faulty dosing. The case is described later. Hellman also notes such a case. One observer advises the repetition of the morphine in cases of restlessness, but this was not tried.

*Post-partum Haemorrhage.*—There was only one case of this incident, and it was easily checked by hot douching and pituitrin.

*Forceps Cases.*—There were 14 forceps cases in the 40 cases, or 35 per cent. This, no doubt, seems a large percentage, but is no higher than under ordinary circumstances in our practice, which entails the application of forceps after the second stage has lasted three and a half hours. From this it may be inferred, so far as we could decide, that the scopolamine-morphine did not in any way interfere with the strength of the pains. In five cases forceps were applied without chloroform; in the others they could have been applied without pain, but the patients, on being interfered with, became restless, so chloroform was given, merely to allow of their more simple application.

Comparing the statistics for these complications with those of Hellman:

| | Forceps. | Post-partum Haemorrhage. |
|---|---|---|
| Royal Maternity Hospital ... | 35% | 3.3% |
| Hellman ... ... ... | 9.06% | 2.5% |

Giuseppi in his paper quotes a percentage of 33 forceps cases.

### *Baby Statistics.*

In the 40 cases there were 40 babies, 5 dead born, but in only one of these was the labour normal.

One was a case of contracted pelvis with prolapse of the cord. The child was turned and extracted with difficulty. The patient only had four injections, and then chloroform. She had come into hospital well on in labour, with a previous history of a stiff forceps case. The second dead-born baby was a very badly nourished premature child of a woman who had a very bad heart lesion. The third was a craniotomy for contracted pelvis, where the second stage was allowed to continue for nine hours to permit of moulding. The fourth a premature child of seven months. The fifth was a normal labour, which lasted twelve hours, during which eleven injections were given.

Out of the thirty-five babies born alive, only four required any artificial stimulation. In two of these cases the morphine had been repeated, and the labours were very long. In all cases the child cried on being smacked and having cold water thrown on it. In several cases the method of injecting the morphine and hyoscine late in the second stage, to relieve the pain, was tried. This was done in patients who were too far on in labour for the proper technique to be attempted; in these it was generally found that the babies born were oligopnoeic. This helps to prove that when the initial injection is given in the second stage the chances of the baby being born oligopnoeic are very much increased.

Hyoscine alone has evidently no effect on the child. In the case of forty-five injections the baby cried at once.

From these points it can be seen that the danger to the child is very slight. The four cases of oligopnoea were not at all severe, and required only slight stimulation.

### *Comparisons.*

The following cases are worthy of mention.

#### CASE I.

Mrs. H., 1-para, aged 34. Admitted 2.15 p.m., February 27th. She had had three eclamptic fits before admission. She was

due in the middle of March. Her blood pressure was 168, and she was treated with veratrone. She had two more fits, but after more veratrone her blood pressure went down to 80, and they ceased. Her urine contained 4 grains of albumin per ounce, and she passed 6 oz. At 10 a.m. next day the patient went into labour, and at 11.30 was given morphine gr. ¼, hyoscine gr. $\frac{1}{150}$; the os admitted one finger, and the pains were strong. Her blood pressure was taken every half-hour and veratrone given when it was high. The injections of hyoscine were given every hour; after the third injection her memory was gone, and she was sleeping. The injections were continued, and the baby was born at 11.30 p.m. with forceps without chloroform (to bring the head over the perineum). The baby cried at once. The veratrone was continued during the labour to keep the blood pressure low. The mother and child both did very well, and left hospital twenty days later.

CASE II.

Mrs. M., aged 31, 1-para. Admitted 11.45 p.m., March 14th. Os the size of a shilling; pains strong. At 1 a.m. on March 15th, morphine gr. ¼, hyoscine gr. $\frac{1}{150}$; the hyoscine was repeated in gr. $\frac{1}{150}$ doses every hour. The patient slept; she said she felt pains a little, and at 2.30 p.m. became more awake. Morphine gr. ¼ was given at 2.30 p.m. The hyoscine was continued every three-quarters of an hour. These were continued all the next day, March 16th; the patient was sleeping most of the time, and when asked if she felt any pain, she complained of a sore shoulder and wandered in her talk. At 9 p.m. on March 16th, the head appeared to have stuck, so forceps were applied. The os had been fully dilated for some hours, but the patient had been left to see if the child would be born spontaneously; for the fetal heart sounded good, and the patient's condition likewise. As the patient was slightly restless, chloroform was given. It was a firm pull, and there was a slight tear. The baby was born at 9.45 p.m., March 16th, and cried at once. Next day the patient could remember nothing except the pain she had when she came into hospital. She had quite lost count of the days, and did not know what day it was. The total number of injections in the case was one morphine gr. ¼, hyoscine gr. $\frac{1}{150}$, one morphine gr. ¼; forty-three injections of hyoscine gr. $\frac{1}{150}$. This was the greatest number given.

During the labour she had drinks of water and was catheterized. She appeared very fit the next day after the labour, and the child was very well.

CASE III.

Mrs. A., 1-para, aged 26. Admitted February 18th. On February 18th the pains were very strong and regular, and the os admitted two fingers. Morphine gr. ¼ and hyoscine gr. $\frac{1}{150}$ was injected. In half an hour the patient was sleeping, the hyoscine was injected after an hour. She was very congested about the face, and complained of great thirst. She was sleeping between the pains, but awoke during them. At the end of three hours from the first injection (she had had two of hyoscine and her memory had gone) she began to get a little restless during the pains. The injections were continued, but the restlessness got worse. She became obstreperous, tearing her hair, throwing herself about, and trying to bite the nurses. She had to be held in bed. However, she did exactly as she was told at the time—namely, when told to lie down she did so, but the restlessness soon started again. It was decided to stop the injections. Her memory was still gone, but it was difficult to apply the test. Two hours later she was much quieter and delivery was quite normal. She had eight injections. She slept for six hours, and then she felt quite all right. She could not remember anything about the restlessness, but just remembered the baby being born. The baby cried at once.

SUMMARY OF PROCEDURE.

The following is a summary of special points which are most important:

1. In the case of a primipara the first injection must not be given too early, as it tends to stop the pains. The rule of giving the first injection when the os admits two fingers, and the pains are regular, is a useful one. In the case of a multipara, however, the injections cannot be given too early after the pains have started. It is generally found that the first injection is given too late.

2. The second injection, namely, the first $\frac{1}{150}$ gr. of pure hyoscine, should be given about an hour after the initial injection, whether the patient is well under or not. If this injection is delayed the effect of the morphine tends to wear off, when the future injections of hyoscine will not take effect.

3. The injection can with safety be repeated either at hourly or three-quarter hourly intervals.

4. Do not repeat the morphine in the latter part of the second stage or the child will most probably be born oligopnoeic. If the hyoscine is not taking effect, then it is well to give the mother a slight whiff of chloroform; thus the hyoscine is allowed to work and the patient gets again into the condition of "twilight sleep."

5. The patient's friends must be kept away from the room, which ought to be quiet and darkened.

6. Patients, if thirsty, must be given water to drink.

7. The bladder must be catheterized during long labours.

8. Remove the baby to another room after birth, so that the mother cannot hear the cries, otherwise she may remember the cry and so piece together, and so imagine her whole labour.

CONCLUSIONS.

From the foregoing experience it may be stated that we have a safe and efficient means of managing labour painlessly in the majority of cases. It requires, however, the constant attendance of a competent attendant. This rôle can be efficiently undertaken by a reliable nurse under supervision, which makes its adoption in better class private practice possible to the medical practitioner.

It is of special value in primiparae, in whom as a rule the first and second stages of labour are long and painful.

It is also of great value in a prolonged second stage, due to a large head or slightly contracted pelvis, as it allows of head moulding without unduly exhausting the patient.

So far as amnesia is concerned, it is of little use to commence the treatment during the second stage.

The strength of the uterine contractions is not diminished, hence its advantage over chloroform. There are no contraindications to its use beyond extreme restlessness, which is very exceptional, and probably due to an idiosyncrasy.

The absence of exhaustion after even a long labour is one of its greatest advantages.

Thirty-seven of the forty patients rose from bed on the third day after labour.

It is regrettable that such a great deal of publicity has been given to the subject, and that prominent specialists have allowed themselves to be exploited through the lay press, as the lay community suffers from the want of knowledge and sense of proportion which allows of an estimate of its value under various conditions, and is therefore too apt to attempt to force the hand of the careful practitioner. At the same time, the method of management of labour is so good from the point of view of relief of suffering, that it may help materially to bring about the increase of the birth-rate so much required, which is perhaps the only argument in favour of publication in lay journals, etc.

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## RETRACTION OF THE UTERINE MUSCLE ASSOCIATED WITH OBSTRUCTED LABOUR.

BY

H. T. HICKS, F.R.C.S.,

GYNAECOLOGICAL SURGEON, DERBYSHIRE ROYAL INFIRMARY.

In 1906 I reported two cases of premature retraction of the uterus occurring in primiparous patients. In both cases the brim of the pelvis was contracted moderately, and in one there was some oblique distortion. In neither case was the bony obstruction of the pelvis too great to prevent delivery with forceps or with the cephalotribe after perforation of the fetal skull. Since then I have seen two more cases.

My reason for again bringing the subject forward is because I know that this condition is not often recognized and that I have altered my own views in the light of further experience.

In order to make the condition clear I will give one case in detail.

A primipara, aged 30, rather short in the long bones and square about the head, went into labour at full term on June 27th, at 10 p.m. She was seen by the doctor next morning; he found the os about the size of half a crown (about 3 cm.). The fetal head was high above the brim and freely movable. The head seemed half extended. The diagonal conjugate was taken and measured 4¼ in. The cervix hung loosely below the presenting part. By 8.40 p.m. on June 28th the os was apparently fully dilated, but still not filled by the presenting part. The doctor came to the conclusion that there was enough room to allow of an easy delivery with forceps. The membranes had

been ruptured a few hours before; forceps were applied with ease, but moderate traction failed to bring the fetal head down into the brim. About 11 p.m. forceps were again applied, but without result. The patient seemed quite well, and as the uterine contractions had slacked off, the doctor decided to wait till the morning, hoping that the fetal head might be driven and moulded into the brim. Forceps were again applied on the morning of June 29th, but without any result.

I saw the patient early in the afternoon, about forty hours after the onset of labour. I measured the pelvic cavity digitally, and found that the sacral promontory was high up and the diagonal conjugate 4½ in. The ilio-pectineal lines seemed massive and narrowing the transverse diameter. The external measurements, taken afterwards, were of no practical value. Thus this was a rickety, flat, generally contracted pelvis, the contraction being only moderate. The cervix was fully dilated, but was hanging down unfilled by the presenting part, and was very oedematous. The fetal head was of normal size. It was lying above the brim, and could be made to flex or extend at will. It could also be rotated around a vertical axis. On passing my hand above the mobile fetal head, a thick band of uterine muscle was found to have formed round the neck of the child. Two fingers were passed along the neck of the child above the limit of the band; the clavicle and arms of the fetus could be reached. The condition was clear — the uterus had gone into tonic contraction while the head of the child was still high above the brim. The neck of the child was therefore above the lower limit of the retractile and contractile muscle. The retractile uterine muscle had moulded itself to the fetal neck, forming a firm muscular ring, while the thinned-out lower zone contained the mobile fetal head.

As the patient lived on a farm twenty-two miles away from the hospital, I thought it would do no harm to make one attempt to pull the shoulders through the muscular ring. She was put deeply under chloroform, and after perforating the fetal skull and applying traction with the cephalotribe it was obvious that the fetus and uterus had become one welded mass. Traction merely brought the whole mass down, and when released there was an elastic recoil to the original position. I removed the fetus by Caesarean section, but the patient, who was in a cyanosed and collapsed condition, died next day.

In all these cases there is some form of contraction or distortion at the pelvic brim. The fetal head does not engage and remains high above the brim, and is very mobile. The uterus continues to contract and retract. The membranes rupture early and the cervix hangs down unfilled by the presenting part. At some time after the membranes rupture the uterine muscle passes into a state of tetany, and since the neck of the fetus is high above the brim, it lies within the retractile zone of the uterine muscle. A firm mass of muscle forms round the neck of the fetus and grips it, so that the shoulders can neither pass through nor can the fetal head rise. The uterine cavity has therefore become hourglass in shape. The upper cavity contains the trunk and the lower the head. As retraction progresses the uterus moulds itself to the fetal trunk and neck, while the lower zone becomes progressively thinner. This condition may come on a few hours after the rupture of the membranes, and when once established constitutes one of the most terrible complications met with in obstetric surgery.

In a great number of moderately contracted pelves the fetal head settles in the brim. Here is a very different situation. In dealing with such cases it is only necessary to overcome the mechanical obstruction, for the neck of the fetus lies within the lower zone of the uterus. Thus if early retraction of the uterus takes place, its lower limit is above the shoulder of the fetus. Delivery with forceps or cephalotribe can be effected according to circumstances. When the fetal head is high up and the retraction ring has formed round its neck, no amount of traction will be of any use, because the trouble now lies above at the retraction ring. The shoulders cannot pass below this ring, and the whole mass—uterus and fetus—becomes as it were welded together.

Some of the cases are admitted with a leg and the head presenting. This tells its own tale. Version has been attempted, and a leg brought down, but the fetal head cannot rise, so matters are only made worse, and if delivery is attempted the uterus will be ruptured. These poor cyanosed patients are admitted into hospital in a state of exhaustion, and with the vagina hopelessly lacerated. For hours they have been under an anaesthetic; delivery has been attempted with forceps, cephalotripsy, and even by version.

This condition is ill described in textbooks, and is not recognized by many obstetric surgeons themselves. If a practitioner has missed an obviously contracted pelvis and has spent the whole night with his colleagues attempting to deliver a fetal head through an impossible pelvis, then blame him as much as possible. The cases here described come under a different heading, and they present great difficulties both in diagnosis and in treatment. In order to save the child a very early diagnosis is necessary, while any great delay endangers the mother's life.

*Diagnosis and Treatment.*

The patients are all primiparae. They are either the subjects of infantile rickets or have some deformity, such as old disease of the hip-joint. Let us suppose that the patient is at full term and labour has just begun. The abdomen may be pendulous and the fetal head felt just above the brim. The measurements of the pelvis are taken. If there is great deformity, say a diagonal conjugate of 3½ in. or less, the mechanical obstruction is so obvious that steps would be taken to meet it. In all the cases I have seen the mechanical obstruction has not been very great.

In the second case, published in the *Lancet*, "Mr. Targett's case," May 12th, 1906, the measurements of the pelvis were taken clinically, and I measured the bony pelvis after removing it at the *post-mortem* examination. The actual measurements from bony points were:

| | |
|---|---|
| Interspinous diameter ... ... ... ... | 8½ inches. |
| Intercristal diameter ... ... ... ... | 9¼ ,, |
| Posterior interspinous ... ... ... ... | 3½ ,, |
| True conjugate... ... ... ... ... ... | 4 ,, |
| Right oblique ... ... ... ... ... ... | 4¼ ,, |
| Left oblique ... ... ... ... ... ... | 4⅝ ,, |
| Transverse ... ... ... ... ... ... | 5 ,, |

In fact, a woman who is an obvious dwarf or has a hopeless pelvis is in a far more safe position than one who has less pelvic contraction, especially if there is oblique distortion at the brim of the pelvis. Let us premise that the pelvis is only moderately contracted, and the doctor estimates that he can deliver with forceps if necessary. The presenting part is a vertex and lies high above the brim. It seems flexed or it may be half extended. Labour is allowed to proceed. The uterine contractions are strong and the os dilates, but is never filled by anything except the membranes. These rupture early and the cervix hangs down and becomes oedematous. It feels dilatable, but is not completely dilated. The uterine contractions continue, but after a while there seems to be no attempt at bearing down, and the patient complains of a continuous uneasiness about the abdomen. The fetal head is still above the brim. It seems to become more mobile, because the lower zone is thinning out, and when the uterus contracts it seems to be lifted higher up. If the examining hand be passed above the head the retracting ring will be found. Just about this time forceps are applied, and if the real state of affairs is not at once recognized, disaster will follow.

The position of the fetal head is perhaps the most important point. Before labour sets in it is high above the brim, while in a primiparous woman it should be right down in the pelvic cavity.

As the first stage of labour proceeds the head still remains high up, and as labour still progresses it becomes more mobile and will even ascend. At first, then, the fetal head cannot enter the pelvic brim because of the bony obstruction, but later this becomes of secondary importance because a retraction ring has formed around the fetal neck. It is this ring which is the cause of failure to deliver by mechanical traction from below. No amount of traction will bring the shoulders of the fetus through this retracting barrier of uterine muscle. The ring will hold even with the patient at the point of death.

With regard to the treatment, it is clear that an early diagnosis is all-important. One cannot too much emphasize the fact that a high and mobile fetal head occurring in a primiparous woman means trouble. It is a simple indication of trouble, but one often neglected. If the practitioner thinks there is room enough to allow of forceps delivery, and the fetal head is high above the brim and movable, the patient may be placed deeply under chloroform and morphine. If moderate traction fails to bring the head into the pelvic cavity, and if, when the traction is released, there is an elastic recoil of the fetus and uterus, no further attempt should be made. Caesarean section is the only safe means of delivery, making it even possible to save the child as well as the mother. It is absolutely wrong to persist in any further attempt at delivery from below.

While performing Caesarean section on one of these cases, which, unhappily, was only a last desperate attempt

to save the mother, I had great difficulty in extracting the fetal head from the lower thinned-out uterine cavity. The retraction ring held firmly, although the patient was deeply under morphine and chloroform. It was also interesting to note at the time of the operation that, although there was a firm band of uterine muscle around the neck of the fetus, there was no sign of this externally. I opened the upper cavity of the hourglass and caught a leg. I had to deliver the fetal head, which was below the muscular bar, by jaw traction. I mention this fact because it shows the persistence of the muscular tetany in a collapsed patient under both morphine and chloroform.

It will be noticed that I have made no reference to text-books or papers. I wish only to give a clear clinical account of a condition which I know occurs time after time without being recognized. Many practitioners may go thirty years without seeing a case of this kind, or never see one at all.

In one of the latest books on obstetrics this condition is lightly touched upon. The author states that it is due to (1) the administration of ergot, or (2) to spasm, caused by repeated attempts at delivery. He recommends the administration of morphine gr. ½, deep anaesthesia, and appropriate means to overcome the obstruction.

I have never seen any cases in the early stages of labour, but from the careful accounts given by the doctors in charge I feel sure that the retracting barrier had already formed when forceps were first applied. Again, the measurements of the brim in each case had been taken, and if the real trouble had been simply a mechanical obstruction at this point, the fetal head could have been delivered either with forceps or with the cephalotribe. I have seen a patient who had been more or less under deep anaesthesia and morphine for ten hours, yet the retracting uterine muscle still gripped the neck of the fetus. None of the cases had been given ergot. Of the four cases I have seen, only one recovered. Two died within a few hours of delivery, while the last died suddenly of pulmonary embolism on the fourth day of the puerperium. In my former paper I suggested that decapitation with delivery of the fetal head, followed by version, was a means of effecting delivery, but in the light of further experience I am now convinced that Caesarean section is the safest and best method of treatment. The earlier this is done the better.

### Conclusions.

I would make the following suggestions:

1. Be on your guard when dealing with a short, thick-set woman with a square head and short long bones.
2. A high position of the fetal head, occurring in a primipara, should at once denote serious trouble.
3. Measure the diameters of the pelvis, but do not place too much store upon your estimate. The brim may be obliquely distorted, and this will prevent the head from entering the brim and at the same time will not show up in your calculations.
4. Cut-and-dried rules on pelvimetry are useful only in severe contractions of the pelvis.
5. Remember that to apply forceps to a fetal head which is movable and high above the brim is an obstetric operation requiring the most careful consideration, and should only be undertaken after careful examination of the condition of the uterine muscle around the neck of the fetus. If the examining hand can be passed easily beyond the shoulders of the fetus, an attempt at delivery with instruments may be made. If there is the least evidence that the uterine muscle is retracting round the neck of the fetus, Caesarean section should at once be performed.
6. When once the retraction ring has formed around the neck of the fetus, it will grip it firmly until the patient is almost at the point of death.

P.S.—Since writing this short paper I have seen another case. In spite of much bruising and laceration of the vagina an earlier diagnosis rendered it possible to save both mother and child by Caesarean section.

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We are glad to learn that Professor Kocher of Berne has recovered from a severe attack of double pneumonia and pleurisy which he experienced in the spring and is resuming his work as professor of surgery. His recovery, at the age of 75, from so severe an illness is evidence of the vigour of his constitution and will be a source of great gratification to his many friends in this country.

## BREATHLESSNESS IN SOLDIERS SUFFERING FROM IRRITABLE HEART.

BY

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*(Report to the Medical Research Committee.)*

Breathlessness may arise from any one of a great number of causes, some of which, like mechanical impairment of the heart or lungs, are apparent, while others are more obscure. The immediate stimulus to the respiratory centre is in most cases a chemical one, so that the difference between the cases in which the cause of breathlessness is explicable and those in which it is obscure depends on whether there is an evident clue to a chemical change in the blood which may be transferred to the respiratory centre. Thus, in the commonest physiological type of breathlessness, that due to muscular exercise, carbonic and lactic acids are passed into the blood and stimulate the respiratory centre; in the case of patients recently gassed the want of sufficient functional lung surface dams back the carbonic acid in the blood and so produces breathlessness. More obscure, because the cause has to be sought directly in the blood itself, is the condition of acidosis, though this, in respect of its symptom of breathlessness, falls into the same group with that of the previous cases, since in all alike the exciting stimulus to the respiratory centre is a relatively acid condition of the blood.

The object of the present paper is to draw the attention, and especially, at the present time, of those charged with the care of military patients, to another and more subtle cause of breathlessness. The reason for our doing so is that we have found it to exist in five out of six cases in which the cause of the breathlessness present was so far in doubt as to make a systematic examination of the chemical properties of the blood desirable. The cause of breathlessness to which we refer is the absence of an adequate supply of "*buffer*" *salts* in the blood. The patients in which this condition is present are to be found amongst those who are diagnosed as having "irritable hearts" or "trench hearts," that is, among the number of soldiers invalided during the period of training or while on active service because they are unable to tolerate physical exercise. In these cases exertion produces some of the following symptoms—namely, excessive fatigue or actual exhaustion, attacks of giddiness or actual fainting, palpitation and pain usually situated in the precordial region. The patients to whom we refer show no constant physical signs, but in the majority of them the heart rate is abnormally high when the subjects are up and about. Moderate exercise increases the pulse-rate excessively. It is the rule to find high respiratory rate in these subjects while they are at rest, and in some cases this rate may be as high as 40 per minute.

Let us now turn to the consideration of "buffer" salts, and to some explanation of the part which they play in the pathology of the cases under consideration.

The blood is at all times receiving and parting with acid and alkali. These variations in constitution, if effected in an ordinary saline solution, would produce changes in relative acidity and alkalinity which would be physiologically intolerable; their effect on the brain alone would be to excite or depress its various centres to extreme limits. The respiratory centre, for instance, would be stimulated to violent dyspnoea by the acidity resulting from trivial exercise; it would be brought to a standstill by a moderate acquisition in alkali. A given addition of carbonic acid to the blood only produces a quarter of the change in reaction which it would produce in a corresponding quantity of physiological saline solution. Thus, if 100 c.cm. of blood be taken and the same quantity of normal salt solution, 1.3 c.cm. of carbonic acid dissolved in the saline would change its reaction to the same extent as 5 c.cm. would change that of the blood. The reason of this is that the blood contains such substances as sodium bicarbonate, monacid and diacid sodium phosphates, and

protein, which tend partly to fix the acid so that in a sense it loses its chemical freedom. For the sake of example the attention may be confined to the two phosphates, $Na_2HPO_4$ and $NaH_2PO_4$. If a little carbonic acid is added to a solution containing these two salts, a little sodium bicarbonate is formed, which is alkaline. The sodium is acquired by the $CO_2$, at the expense of the phosphates, so that there is less of the alkaline $Na_2HPO_4$, and more of the acid $NaH_2PO_4$ than before. The net result is a slight increase in the acid reaction. The blood forms a more complicated system of this type. The salts to which we have alluded are therefore called "buffer" salts, because they ease the shock to the reaction of the fluid caused by the addition of acid or alkali.

The bearing of these general observations on the cases of breathlessness which we have studied is perhaps best explained by recounting the history of our investigation of a single case—that of A. The case was referred to us by Lieutenant Drury, R.A.M.C.,* with the request that we should test it for acidosis. We found:

1. That when all the $CO_2$ was shaken out of the blood it was somewhat more alkaline than normal blood.
2. That with the amount of $CO_2$ normally present in the body it was just on the acid side of normal; and
3. That any further addition of acid increased the acidity to an abnormal degree.

We therefore tested other cases which presented a similar clinical picture in the same way, and we found that out of six cases tested and compared with four normal men of similar age the changes in reaction of the blood were as follows:

*Change† in Blood Reaction for the Addition of 5 Volumes of $CO_2$ per 100 of Blood under the Conditions Prevalent in the Body.*

| Normal Persons. | | Dyspnoeic Patients showing Typical Symptoms of "Irritable Heart." | |
|---|---|---|---|
| R. ... | 0.045 units | Z. ... ... | 0.155 units |
| C. ... | 0.068 ,, | A. ... ... | 0.102 ,, |
| O'L. ... | 0.050 ,, | J. ... ... | 0.119 ,, |
| P. ... | 0.051 ,, | R. R. ... | 0.102 ,, |
| | | G. ... ... | 0.086 ,, |
| | | T.* ... ... | 0.064 ,, |

Of these T.* proved to be a case in which the reaction of the blood was less alkaline throughout than normal. His dyspnoea was therefore explicable on other grounds than those of insufficient buffers.

The units used in the above table are those familiar to chemists as to the alteration in the logarithm of the concentration of hydrogen ions in the blood. We prefer to state the case in the following way:

If the average change in the acidity of the blood when five volumes of carbonic acid are added be called 100 the changes observed in the case of the five patients whose cases are not otherwise accounted for are:

*Change in Relative Acidity expressed as a Percentage of that of Normal Men.*

| Z. | A. | J. | R. R. | G. |
|---|---|---|---|---|
| 200 | 200 | 220 | 200 | 150 |

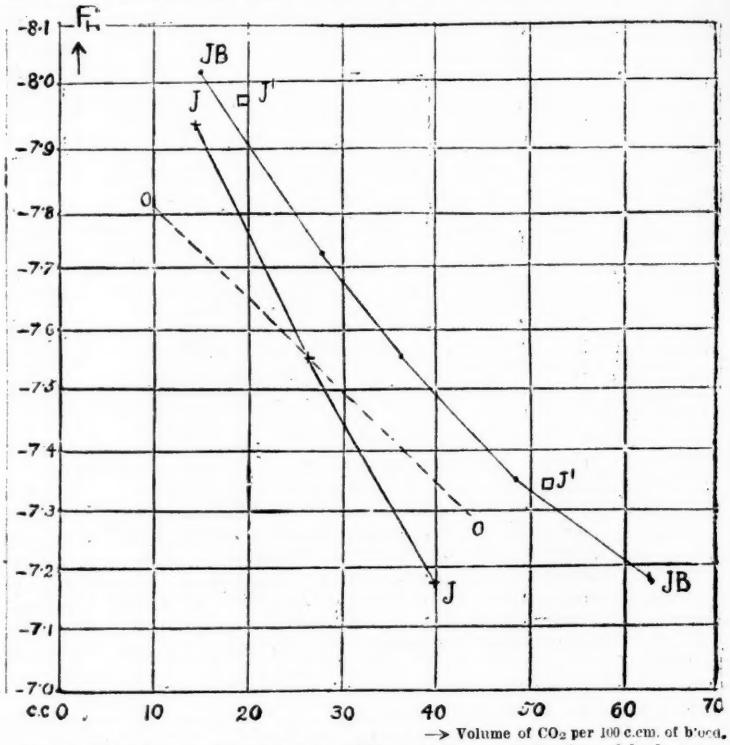
These results were all obtained by an indirect method of determining the blood reaction based on the affinity of the blood for oxygen; but as it was clearly unsatisfactory that a result so important should depend on data obtained by a single method, the direct determination of the concentration of hydrogen ions by the electrometric method was made on one of these cases, Z., and compared with that of two normal cases.

*Change in Reaction produced by addition of 5 Volumes of $CO_2$ per 100 of Blood measured by Electrometric Method.*

| Normal. | | Dyspnoeic. | |
|---|---|---|---|
| R. ... ... | 0.045 units | Z. ... ... | 0.160 units |
| P. ... ... | 0.05 ,, | | |

Expressed as a percentage of the normal, therefore, the change in acidity of Z.'s blood would be about 320 per cent. of the normal.

The measurement of the quantities involved is near the experimental error of whatever method may be employed for the purpose, yet we consider that the agreement in the figures is striking enough to warrant our conclusions. Nevertheless, we have obtained additional confirmation of our argument from the fact that we were actually able to impose the properties of normal blood upon that of one irritable heart patient by the addition of "buffer" salts. The blood of J. before we did this had a change of reaction of 0.119 as compared with the normal 0.045 to 0.06.




The vertical figures denote the logarithms of the concentration of hydrogen ions in the blood ($P_H$).

It was compared with the blood of J. B., a much older person, normal in the sense that he is not unduly dyspnoeic for his age on taking exercise, though he possesses a history of functional cardiac trouble. The comparison is shown graphically in the figure in which the reaction of the blood is plotted vertically in units corresponding to $P_H$.

The line indicated by the letters JB–JB shows the changing reaction of J. B.'s blood when it contains the quantities of carbonic acid shown successively by the abscissae. The line J–J shows that of a case of irritable heart. Note that the line, especially at the lower end, which represents the usual carbonic acid conditions in the body, is much steeper in the case of J. than in that of J. B. When disodium hydrogen phosphate ($Na_2HPO_4$) is added to the blood of J. to the extent of 0.003 gram per c.cm. the inclination of the line is changed, as shown in the dotted line O–O, whilst if 0.003 gram of sodium phosphate per c.cm. and 0.0008 gram of sodium bicarbonate be added, the points marked $J^1$ $J^1$ are obtained, which are nearly on the curve of the person (J. B.) with normal respiratory phenomena.

* The present research arose from one conducted by Lieutenant Drury, R.A.M.C., on the carbonic acid in the alveolar air and the effect of breathing small quantities of that gas. As he was shortly afterwards detailed for service abroad, we lost his very valuable assistance.

† Variations in the "buffer" value of human blood have been found by Levi and Rowntree.—*Archives of Internal Medicine*, vol. xvii, p. 525.

These observations seem to us to be important, first of all because they demonstrate an altered state of the blood which goes far to explain the otherwise inexplicable breathlessness in certain patients who suffer from the condition described as irritable heart. They are important from another standpoint. The temptation to cover our ignorance of the pathology of the malady as a whole by referring many of its symptoms to instability or to irritability of the central nervous system was a powerful one, so long as clear deviations from normality could not be found. Our observations carry us from the abstract to the concrete, and tell us that we deal with an affection in which disordered metabolism plays a conspicuous rôle. If we are inclined hastily to judge the temper of our fellow-men, holding that poorness of spirit and lack of zeal contribute to the histories of physical inefficiency as they are related to us, such findings bid us beware, reminding us that there may be no more potent restraint to the display of spirit than the early conditions of ill health.

# THE ESTIMATION OF MYOCARDIAL EFFICIENCY.

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THIS article is based on 2,000 observations made on healthy and diseased hearts during the past five years.

The majority of those made on the "healthy" heart, and the reactions worked out in connexion with them, were carried out on students in the Middlesex Hospital, and to all those gentlemen who so willingly and unselfishly sacrificed their Saturday afternoons in order to climb endless stairs—often to the point of extinction—the writer offers his most grateful and sincere thanks, and assures them that their time was not wasted. In this connexion he would also thank Mr. Dale Richards for his assistance in some of the work. The observations on pathological hearts were carried out partly on my own private patients and partly on cases at the National Hospital for Diseases of the Heart.

The measure of a heart's efficiency is its capacity for doing work, and this is true whether one is dealing with the physiological heart of the healthy young adult, the worn-out heart of the old man, the "super" heart of the well-trained athlete, or the pathological heart, the seat of definite valvular disease, myocardial atonia, inflammation, or degeneration. Furthermore, it must be clearly borne in mind that many hearts work perfectly, exhibiting no defects at all, when the person is at rest, but exhibit serious derangements and reveal definite evidence of myocardial impairment when called upon to do extra work under load. Such defects are usually revealed by the development of irregularities—murmurs, pulsations, etc.—which did not previously exist.

## WORK REACTIONS.

### (a) *The Healthy Heart.*

The physiological heart of the healthy young adult responds to increased work by increased contraction—the rate increases, the blood pressure rises, and the respirations increase. The increase in the heart-rate, in the blood pressure and respirations, is gradual, while a definite relationship is still maintained between the pulse-rate and respirations. The rise in the pulse rate, in the blood pressure, and respirations is proportional to the amount of work done, but it is rare in healthy people to be able to raise the heart beat beyond 180 a minute excepting by the most violent forms of exertion.

The height to which the blood pressure rises is, apart from training, etc., largely influenced by age, but for a healthy young adult 220 mm. of mercury may be taken as the limit. On ceasing exercise the heart-rate, blood pressure, and respirations, fall rapidly; the blood pressure usually reaches normal (that is, starting point) before the heart-rate. The respirations being the first to return to normal.

### (b) *The Athlete's Heart.**

The slow "super heart" of the well-trained athlete also responds to increased work by increased contraction and a raised blood pressure, but whereas the heart of the "ordinarily" trained individual gradually increases in frequency, that of the athlete suddenly "practically" doubles its rate.

### (c) *The Diseased Heart.*

The pathological or diseased heart in which the myocardium is at all impaired responds to increased work, not by increased contraction, but by dilatation, so that, although the frequency is increased (often out of all proportion to the amount of exercise taken), the blood pressure either fails to rise or actually falls, according to the amount of myocardial damage present and the amount of work done. Furthermore, the dyspnœa and general distress are often marked, while the normal pulse-respiration ratio is frequently disturbed. Finally, irregularities of various kinds (such as extrasystoles,† auricular fibrillation, and alternation, etc.), murmurs, or pulsations, not previously present, may make their appearance.

As regards the practical application of the above principles, the methods usually adopted by the writer and found to be quite satisfactory are briefly as follows:

### 1. *The Simple Stair Test.*

The patient is weighed and his weight recorded in pounds. He is next made to lie down on a couch, and his pulse-rate, systolic blood pressure (brachial), and respirations recorded as below:

NAME ... SEX ... AGE ... WEIGHT ... DATE ...

| | PULSE | B.P. | RESP. |
|---|---|---|---|
| NORMAL | | | |
| AFTER 1ST EXERCISE | | | |
| AFTER 2ND EXERCISE | | | |

NOTES:—

He is next made to do a definite amount of work in a given time, his pulse, blood pressure, and respirations again being recorded immediately after his return to the couch. As it is most important to get the readings as quickly as possible, two observers are employed, one standing on either side of the couch; one observer takes the blood pressure (the armlet being left in position during the exercise and the manometer being a fixture on the wall), while the other takes the respirations, and whichever completes his observation first takes the pulse. These are recorded on the card as before. These observations are then repeated periodically—for example, every minute—until pulse, blood pressure, and respirations are normal.

For ordinary purposes a very convenient test is to make the patient raise his body weight 20 ft. in not longer than 30 seconds. This is easily done by making him run up a flight of stairs of the required number. His pulse, blood pressure, and respirations should be normal at the end of three minutes after the exercise, if his myocardium is in good condition. The work done (in foot pounds) is easily obtained by multiplying the body weight (in pounds) by the distance through which it was raised (in feet). For purposes of diagnosis it is not necessary to calculate the actual work done, but if the reaction is to be used for remedial purposes, this is essential. In examining the results obtained, the most important points to pay attention to is whether the blood pressure rises or not immediately after the exercise. For practical purposes the results can be classified as follows:

1. *Good reactions*, when pulse, blood pressure, and respiration all increase on exercise and are normal again at the end of three minutes.

| | Pulse. | Blood Pressure. | Respiration. |
|---|---|---|---|
| Normal ... ... ... ... | 116 | 152 | 22 |
| After exercise ... ... ... | 124 | 180 | 24 |
| Three minutes after exercise... | 116 | 152 | 22 |

W. = 2,580 ft. lb. in 30 seconds.

* The writer is of opinion that different effects are produced on the heart by different kinds of exercise—for example, long distance cycle racing produces quite a different heart from rowing.

† Much difference of opinion exists as to the nature and significance of extrasystoles. The writer definitely holds the view that any heart which shows no extrasystoles when at rest, *but systematically develops them on exertion*, has a damaged myocardium.

2. *Fair reactions.* These include all cases in which pulse, blood pressure, and respiration go up on exercise, but have not returned to the normal at the end of three minutes. Their general return is, however, along normal lines. It may be noted that the pulse-rate is the one that most usually persists raised, and considerable importance attaches to time for which the increased frequency is maintained.

| | Pulse. | Blood Pressure. | Respiration. |
|---|---|---|---|
| Normal ... ... ... ... | 72 | 120 | 18 |
| After exercise ... ... ... | 88 | 130 | 24 |
| Three minutes after exercise... | 80 | 124 | 20 |

W. = 2,560 ft. lb. in 30 seconds.

3. "*Bad*" *reaction*, when the blood pressure fails to rise although the pulse and respiration go up.

| | Pulse. | Blood Pressure. | Respiration. |
|---|---|---|---|
| Normal ... ... ... ... | 72 | 150 | 20 |
| After exercise ... ... ... | 88 | 150 | 24 |
| Three minutes after exercise... | 80 | 150 | 26 |

W. = 3,080 ft. lb. in 30 seconds.

4. "*Very bad*" *reaction*, in which the pulse and respiration increase but the blood pressure actually falls. This is almost comparable to the condition known as Weber's paradox in muscle.

| | Pulse. | Blood Pressure. | Respiration. |
|---|---|---|---|
| Normal ... ... ... ... | 72 | 150 | 20 |
| After exercise ... ... ... | 98 | 130 | 30 |
| Three minutes after exercise... | 100 | 156 | 28 |

W. = 2,910 ft. lb. in 30 seconds.

"Good" reactions are characteristic of well-trained "healthy" hearts, such as occur in those who are physically "fit" and take plenty of outdoor exercise. "Fair" reactions are met with in physiological but poorly trained, atonic, toxaemic, or "out of condition," hearts, such as are met with in persons of sedentary occupations who take little exercise; while "Bad" and "Very bad" reactions are typical of hearts in which the myocardium is damaged either by inflammation, strain, or definite degeneration.

The reaction described above (that is, "the 20 ft. 3 min. stair test") is of the greatest value for the average case, but it must be borne in mind that it is a comparatively mild test, and that a more severe test may be necessary to bring out some of the minor defects which may develop in an otherwise well trained heart; for example, slight local heart strain in a previously well trained and otherwise healthy heart may give a fair reaction to this test, but develop a bad or even a very bad reaction if the exercise be doubled or trebled. The progressive work test, if properly applied will never fail to reveal any myocardial deficiency that may exist.

### 2. *The "Exerciser" Test.*

In cases for which the stair test seems likely to be rather severe, the patient is made to raise weights through a definite number of feet at a definite rate per minute. The number of weights and the distance can be easily varied. Weights from 1 to 10 lb. are used, and they are usually raised through a height of 2 ft. The effects are recorded as in the previous tests.

### 3. *The "Inclined Plane" Test.*

For most serious cases the patient is simply made to walk up an inclined plane (1 in 8) of a definite length in a certain time, and the effects recorded.

In the institution where the writer treats his own cases the height of the staircases, length of the passages, gradients, etc., are all calculated, and a series of tables have been prepared, by means of which the amount of work done in any case can be read without any calculations at all being necessary.

### 4. *The Progressive Exercise Reaction.*

This test is carried out in exactly the same way as the simple stair test, only the work is continued until the blood pressure ceases to rise. This is the point at which the heart is just about to dilate, and gives an accurate idea of the reserve force of the heart muscle and the extent of the cardiac field. In the healthy "young" heart this point is extremely difficult to obtain, but for practical purposes any heart that will stand its owner repeatedly doing 30,000 ft. lb. of work in nine minutes and be normal again within fifteen minutes may be taken as having a thoroughly sound myocardium.

Although I have succeeded in a young healthy heart in producing transient reduplication of the pulmonary second sound, a pulmonary systolic murmur, epigastric pulsation, a tricuspid murmur, or even displacement of the apex and increase in the cardiac dullness by very violent exercise, I have never yet succeeded in causing a definite fall in blood pressure, and I am exceedingly doubtful if it is possible to damage a young healthy heart by exercise alone. If, however, there is fever, anaemia, toxaemia, inflammation, or other form of damage, however slight, violent exercise may produce very serious effects—for example, strain or dilatation. The above remarks apply only to "young" hearts—that is, up to 30, for, save in exceptional cases, one has to be cautious in subjecting persons above that age to such violent tests. In persons with myocardial damage or inefficiency this point is comparatively easy to obtain. This reaction is not only of value for estimating the efficiency of the myocardium at any particular time, and for comparing its efficiency at different times, thus being of the greatest value in estimating the progress of a lesion, but is also of inestimable value in rational treatment.

The method employed for this purpose is briefly as follows: The patient is exercised till the blood pressure fails to rise, and the work done estimated in foot pounds; 1,000 ft. lb. less than the number obtained is then taken. and the patient made to do this amount (that is, 1,000 ft. lb. less than the work necessary to dilate his heart) of work once or more daily for one week; at the end of this time his field of cardiac response is again estimated; all being well it will have improved. 1,000 ft. lb. less than the number now obtained is taken, and the patient made to do this amount of work for another seven days, and the field again estimated, and so on; this is continued each week until either no further improvement is obtained or the limit, 30,000 ft. lb. in nine minutes, is reached.

In carrying out this method of treatment it is essential (1) that the increase shall be gradual, the prescribed work being done once, twice, or three times daily; (2) that it shall be systematic; and (3) that plenty of rest shall be ensured between the exercise.

I have carried out this line of treatment for many years, and in conclusion would urge no one to adopt it who is not thoroughly familiar with the principles on which it is based, and who has not the time and patience to carry it out in all its tedious details. If carried out properly in suitable cases it is doubtful if there is any more successful kind of treatment. It is not possible at present to "cure heart disease," to dilate stenosed orifices, or repair leaky valves, but it may be possible to get the best out of a defective heart by putting that heart to work under the best possible physiological conditions, and the key to this should be a knowledge of what a normal heart can do, and how it does it.

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THE annual meeting of Fellows and Members of the Royal College of Surgeons of England will be held at the College, Lincoln's Inn Fields, on Thursday, November 16th, at 3 p.m.

MESSRS. CASSELL will shortly publish the *Life and Letters of Sir Charles Tupper*. He died towards the end of 1915 at the age of 94, and the book is the record of a long career full of manifold activities. Beginning life as a doctor, Tupper took up politics and became one of the makers of modern Canada. He was at one time Prime Minister of Canada, and the present premier, Sir Robert Borden, appropriately contributes an introduction to the biography.

# BOCK'S STETHOSCOPE AS AN AID TO DETERMINING THE EFFICIENCY OF THE MYOCARDIUM.

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Every physician is agreed as to the occasional difficulty in estimating the efficiency or otherwise of the heart muscle, which is a factor of paramount importance in prognosis. Cases occur from time to time which present some of the symptoms, such as dizziness or breathlessness on exertion, which are common both to actual flagging of the myocardial power and to vasomotor instability.

In spite of careful inquiry into the history of the case, and in spite of the many accurate methods of investigation which are nowadays at our command, we cannot invariably form a perfectly definite opinion as to the cause of the patient's symptoms.

Any new instrument, therefore, which can help us in our decisions should be of real use to the profession.

During a discussion on the soldier's heart, reported in the *Proceedings* of the Royal Society of Medicine,[1] Dr. O. Leyton called attention to the value of Bock's stethoscope in helping to decide the point in question—namely, whether certain symptoms are arising from disease of the heart or from disease of the vasomotor system. Dr. Leyton also referred to this instrument in the *Lancet* of February 5th, 1916.

As a thorough trial of Bock's stethoscope has convinced me of its undoubted value, a short account of its use in a military hospital may be of interest.

The principle of this stethoscope depends upon the fact that the normal ratio of intensities of the first sound at the apex to the second sound at the base is approximately 2 : 1. It has now been established that this ratio is frequently altered when the myocardium is affected, and that it may become 1 : 1.

It occurs to the critic at the outset that some heart sounds are very difficult to hear on account of emphysema or of a stout chest wall. But it must be remembered that this stethoscope is for estimating intensities of sound at the apex and base in the same individual, and that any such difficulty is almost certainly present at both apex and base. That is to say, the stethoscope is a differential one, and it is so made that intensities of sound can be estimated with great accuracy in each case. This is arranged by means of a hole through which the heart sounds pass to the observer's ears. The hole can be increased in size, or entirely obliterated, by turning a screw (attached to the top of the chest-piece) in one or other direction.

To the screw is fixed a small pointer which works round a scale on which, at equal intervals, are the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100. When the pointer is at 100, the hole in the interior of the chest-piece is entirely closed, and no sound reaches the ear of the observer.

To use the stethoscope, the hole is first closed by bringing the pointer to the 100 mark. The chest-piece is then placed over the apex, and the pointer is turned counter-clockwise till it reaches the figure 10. At this mark the heart sounds will be heard with a clearness almost, if not quite, equal to that conveyed by an ordinary chest-piece.

The pointer is again moved round, this time clockwise, until the first sound is indistinguishable; this usually occurs in a normal heart when the pointer is near to the 80 mark.

The pointer is then moved back to 10, and the chest-piece is placed over the aortic base. The pointer is once more moved in a clockwise direction, and the observer's attention is focussed on the second sound, which in a normal heart becomes inaudible when the pointer is in the neighbourhood of mark 45. These figures are those given in the maker's circular which accompanies the stethoscope.

The ratio of intensity, therefore, of first sound at apex and second sound at base may be represented by 80 : 45.

In order to test the accuracy of the above statement, observations were first made on the hearts of fifty men of the R.A.M.C. They were all young and healthy, their average age being 24. None of them had as yet been on active service overseas, but they had undergone several months' training at home, so that one was justified in supposing that they represented a series of normal hearts.

As a result of this examination it was found that the average point at which the first sound at the apex disappeared was 77.7. The highest point was 85, and no case gave a reading below 70. The age of the man did not influence the reading—that is to say, a man of 20 gave a reading of 70, and a man of 31 a reading of 80, while the converse was also shown.

The average point for the second reading at the aortic base was 53—a slightly higher reading than that given in the maker's circular. The lowest reading in the series of cases was 45, and the highest 65. Here, again, age was not an influencing factor. In no case was any valvular disease present. In fact, if such is found, the instrument cannot be used, as the bruit obscures the sounds of the myocardium.

The following illustrate the use of Bock's stethoscope in cases presenting symptoms of illness:

Case I.

Pte. C. H., aged 21; service one year and five months. Stated that after nine months' service in the army he fell into a trench and had concussion of the brain, followed by two "fits." After his recovery he began to have fainting attacks when marching with pack. He was discharged from the army on the grounds of ill health on February 11th, 1916. He re-enlisted on June 15th, 1916, and after a fortnight's service fainted while he was carrying a small load of ammunition. He was sent into hospital. On admission he was found to be 6 ft. in height and very thin. Examination of the various systems showed nothing abnormal. Reading with the Bock stethoscope, 85 : 45. Tracings with the polygraph at apex, wrist, and neck showed his heart's action to be regular and efficient.

This was evidently a case of vasomotor disturbance giving rise to a feeling of faintness. The following is a somewhat similar case:

Case II.

Lance-Cpl. H. S., aged 27; service one year and six months. Came to hospital complaining of breathlessness, faintness, and palpitation. He stated that the symptoms began one month after he joined the army, and were liable to be produced by standing at attention on parade for more than a few moments. If the symptoms occurred when he was off duty, he was able, at first, to overcome them by a strong effort of will, but latterly he had been unable to do so.

When examined at this hospital he was in a highly nervous condition. He was kept under observation for twenty-four hours. As might be expected from his history, a thorough examination led one to the definite conclusion that his symptoms were vasomotor in origin. Reading with the Bock stethoscope, 80 : 40. He was reassured as to the condition of his heart, about which he was anxious, and was sent back to his unit with a note to his medical officer.

One of our difficulties in the army is to convince a man, after careful examination, that his heart is not at fault when he has become deeply imbued with the opposite opinion. The rather injudicious use of the letters D.A.H. (disorderly action of the heart) and V.D.H. (valvular disease of the heart) has hindered the convalescence of many a soldier. It is much better to make use of the corresponding number in the Army List of Diseases. Similarly, in civilian work, if a patient has once been told that his heart is "weak," he carries with him, not unnaturally, an unshakable conviction that he is doomed to an early grave. Unfortunately, he does not get rid of the impression when he joins the army, as the following case will show:

Case III.

Pte. G. K., aged 23, service five months, complained, on admission, of pain in the legs. He stated that his "nerves were upset" and that he got palpitation easily. He was told by his doctor before joining the army that his heart was weak. He is a non-smoker. There is nothing to record regarding his system generally, and polygraph tracings show nothing abnormal. Reading with a Bock stethoscope, 85 : 65.

Cases similar to those quoted above could be given in large numbers if space allowed.

The two following cases illustrate findings with the Bock stethoscope in which the ratio is altered to 1 : 1 and in which there is evidently an involvement of the myocardium:

Case IV.

Pte. J. W., aged 19, had served since the beginning of the war. On admission he complained of abdominal pain and shortness of breath. He gave a history of enteric in Gallipoli, July, 1915; he was in bed for six weeks and had done no full

duty since. He gave no history of any illness previous to the attack of enteric.

His face was slightly cyanosed and pupils dilated. Breathing quiet; pulse 84; tongue furred; teeth good. Slight "lagging" of upper lid when following the movements of the observer's finger, but no enlargement of thyroid, and no fine tremor. Heart: Apex beat diffuse and feeble; area of cardiac dullness not increased. Reading with Bock stethoscope, 50 : 50. The impulses were so weak, both at the apex and at the wrist, that tracings with the polygraph were feeble.

CASE V.

Pte. W. G., aged 36, service three months, stated that while drilling six days before he had an attack of palpitation and pain over his heart. In civilian life he was a part-time postman; he said that he had been subject to similar attacks during the past six or seven years. He gave a history of frequent attacks of rheumatism.

The circulatory system was the only system found to be at fault. The apex beat was feeble, and was in the nipple line in the fifth interspace. No valvular lesion was discoverable; pulse 72, regular, but small in volume. Reading with Bock stethoscope, 55 : 55. Systolic blood pressure 100, diastolic 80, measured with a Tycos sphygmomanometer by the method of auscultation.

Tracings with the polygraph were very feeble. Both the apex beat and the radial pulse merely gave minute periodic elevations on an otherwise straight line. No satisfactory jugular tracing could be obtained.

There is one point in connexion with the Bock stethoscope which I have had no opportunity of testing satisfactorily in a military hospital—namely, whether, when the systolic blood pressure is much raised, there is an alteration in ratio of intensities, although there may not be any symptoms of myocardial weakness.

In one case which was examined the soldier was suffering from arterio-sclerosis and glycosuria, and his systolic blood pressure was 220 mm. Reading with a Bock stethoscope, 80 : 75.

CONCLUSION.

In the Bock stethoscope we have an instrument which is helpful in estimating the functional efficiency of the heart muscle. When used in routine examination it may discover latent myocardial weakness, and so lead to further and fuller examination of the heart. This is a particularly useful point in dealing with soldiers' hearts at the present time.

Conversely, when other signs of myocardial weakness are present these may be confirmed by Bock's stethoscope.

REFERENCE.

[1] *Proc. Roy. Soc. Med.*, vol. ix, No. 4, p. 49.

# EPIDEMIC CEREBRO-SPINAL FEVER:

## *THE PLACE OF THE MENINGOCOCCUS IN ITS ETIOLOGY.*

(FOURTH COMMUNICATION.)

BY

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IT has recently been shown by Hort that the cerebro-spinal fluid in acute cases of cerebro-spinal fever in man sometimes contains a filter-passing virus which is not the meningococcus, but which is nevertheless capable of producing continued fever or death when injected into monkeys.

The filters employed were Chamberland bougies, and the injections were given by the peritoneal route.

Although the number of animals thus injected was small, the results obtained were sufficiently striking to justify further experiment, in view of the unconvincing nature of the available evidence that the meningococcus of Weichselbaum is itself the primary infective agent in the disease in question.

It was therefore decided to pursue the investigation on a larger scale than had hitherto been possible, and the following summary presents the chief results obtained.

### *Experimental Observations.*

The following general observations apply to the sub-joined groups:

1. In all the human cases providing material for injection the meningococcus was isolated from the cerebro-spinal fluid at some time during the course of the disease—though not necessarily from the sample injected—and in each case the classical biochemical and serological tests were fully satisfied. In all these cases the fluid injected was obtained during the life of the patient.

2. It was found that cultural tests, such as the inability to grow at room temperature and on non-albuminous solid media, were quite unreliable in the case of many strains the identity of which was biochemically and serologically indisputable.

3. The action of chloroform vapour for four hours, as well as preservation at cold-room temperature for from one to three days, did not prevent the ultimate isolation of the meningococcus from the cerebro-spinal fluid of acute cases so treated.

4. Serum agar and serum broth were the media mainly used, the horse serum being in all instances thoroughly tested by control cultivation experiments for sterility with regard to both visible and invisible organisms. The serum was delivered from a graduated distributor, so that known volumes could conveniently be used for each culture.

5. Control single intraperitoneal and subcutaneous injections of monkeys with serum broth and saline respectively had been shown by one of us (Hort) in 1915 not to produce continued fever, or death. In addition to this, during the course of the present work two monkeys receiving each an injection of serum broth containing approximately 10 to 12 c.cm. of serum, the highest dose of serum given throughout, remained unaffected.

6. Whenever the supply of animals permitted, the internal body temperature was taken twice daily for some weeks before injection.

7. The upper normal limit of the daily range of the temperature of the three species of monkeys obtained for experiment had been found by one of us not to exceed about 102.4° F. in, approximately, 150 monkeys.

8. All the filters used in these experiments were prepared, tested, and assembled in the manner elsewhere described by the same observer.

9. In all cases control samples of the cerebro-spinal fluid examined for the presence of the meningococcus were incubated both before and after inoculation of solid media and of serum broth. In no instance, when the solid media so inoculated remained without growth, was the sample declared sterile *quâ* the meningococcus until repeated negative results had been obtained on solid media from the incubated cerebro-spinal fluid, or from the primarily inoculated serum broth. In several instances it was shown that the incubated cerebro-spinal fluid gave positive results when the solid media inoculated from the fresh fluid remained sterile.

10. This control was also applied to the isolation of organisms other than the meningococcus from the cerebro-spinal fluid, organisms which, because of their character and of the frequency of their occurrence in fluid collected under good conditions, cannot reasonably be looked upon as contaminations in the ordinary acceptation of that term. The Gram-variable diplococcus of Jaeger, the meningo-bacillus, and, more rarely, the chromogenic Gram-negative diplococci, are cases in point.

11. In the majority of cases providing cerebro-spinal fluid the fluid was collected within the first few hours of the appearance of symptoms, before the inception of specific treatment. These cases are marked with the figure 1 occurring after the number or letter used to designate the individual from which they were obtained.

12. The administration of antiserum or of vaccine was in certain of the cases followed by failure to cultivate the meningococcus from the cerebro-spinal fluid, although the organism had been cultivated and identified from specimens obtained before injection. These cases are differentiated from the former by the figure 2 occurring after the number or letter used to designate the individual from which they were obtained.

*Note.*—In the following tables the filter-passing virus referred to is described, for brevity, by the letter X.

*Group I a.*

Five animals were injected with fresh unfiltered cerebro-spinal fluid containing no visible meningococci at the time of injection. Average volume of cerebro-spinal fluid injected, 13.50 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 40 per cent. |
| Death rate ... ... ... ... | 60 ,, |
| Total pathogenic rate ... ... | 80 ,, |

*Group I b.*

Seven animals were injected with filtered cerebro-spinal fluid in which no meningococci could be demonstrated by laboratory cultivation. Average volume of cerebro-spinal fluid injected, 7.0 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 57.2 per cent. |
| Death rate... ... ... ... | 72.9 ,, |
| Total pathogenic rate ... ... | 85.8 ,, |

*Note.*—The unfiltered cerebro-spinal fluid contained visible meningococci in the case of four of the animals in this group, but not in the case of the other three.

*Group I c.*

Four animals were injected, after 24 to 48 hours' incubation, with undiluted unfiltered cerebro-spinal fluid in which visible meningococci were present in large numbers and from which meningococci were cultivated. Average volume of cerebro-spinal fluid injected, 11.7 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 25 per cent. |
| Death rate ... ... ... ... | Nil |
| Total pathogenic rate ... ... | 25 per cent. |

*Group I d.* [H.]

Six animals were injected with filtered cerebro-spinal fluid, meningococci being subsequently cultivated from the filtrate. Average volume of cerebro-spinal fluid injected, 5.6 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 16.7 per cent. |
| Death rate ... ... ... | Nil |
| Total pathogenic rate ... ... | 16.7 per cent. |

*Note.*—Two animals were injected with unincubated filtrates from fresh cerebro-spinal fluid, the remaining animals in this group being injected with incubated filtrates from incubated cerebro-spinal fluid. In the case of two animals Berkefeld filters were employed, Chamberland F filters being employed in the case of the remaining animals in this group.

*Group II.*

(*a*) *Unfiltered.*—Three animals were injected with unfiltered human cerebro-spinal fluid, incubated for several weeks, from which no meningococci could be cultivated at the time of injection, though they were cultivated from the fresh fluid. Average volume of cerebro-spinal fluid injected, 1.9 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 33 per cent. |
| Death rate ... ... ... ... | 66 ,, |
| Total pathogenic rate ... ... | 66 ,, |

(*b*) *Filtered.*—Two animals were injected with the same cerebro-spinal fluid, filtered. The filters employed were new Chamberland F bougies. Average volume of cerebro-spinal fluid injected, 0.75 c.cm.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 50 per cent. |
| Death rate ... ... ... ... | 50 ,, |
| Total pathogenic rate ... ... | 100 ,, |

*Group III.*

Seven animals were injected with cultures of X in serum broth, from human cerebro-spinal fluid, from the cerebro-spinal fluid of monkeys injected intraperitoneally with human cerebro-spinal fluid, and from the cerebro-spinal fluid of a third passage monkey, no visible organisms having been cultivated from the cultures of X injected.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 57.2 per cent. |
| Death rate ... ... ... ... | 42.8 ,, |
| Total pathogenic rate ... ... | 71.6 ,, |

*Group IV.*

(*a*) *Unfiltered.*—Seven animals were injected with unfiltered subcultures on agar, or on serum-agar, or in serum broth, of meningococci isolated from the cerebro-spinal fluid of acute human cases.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 100 per cent. |
| Death rate ... ... ... | 57.2 ,, |
| Total pathogenic rate ... ... | 100 ,, |

*Note.*—Four of these seven animals were subsequently found to be suffering from extensive tuberculous disease.

(*b*) *Filtered.*—There were two animals in this subgroup, the subcultures injected being filtered.

*Result:*

| | |
|---|---|
| Continued fever rate ... ... | 50 per cent. |
| Death rate ... ... ... | 50 ,, |
| Total pathogenic rate ... ... | 100 ,, |

*Post-mortem* examination of these two animals revealed no tuberculous disease.

*Group V.*

*Cultural Results of Bacteriological Examination of the Blood and Cerebro-spinal Fluid of Injected Monkeys.*

| No. of Animal supplying Material for Examination. | No. of Case supplying Material for Injection of Animal. | Visible Organisms Cultivated from | | Fate of Animal Injected. | Gross *Post-mortem* Changes. |
|---|---|---|---|---|---|
| | | C. S. F. | Blood. | | |
| 53 (giving X) | 5 (1) | *Nil* | *Nil* | Death | *Nil.* |
| 43 ... ... | 6 (2) | Streptococcus | Streptococcus | Death | *Nil.* |
| 73 (giving X) | 8 (2) | *Nil* | Not examined | Fever | Still living. |
| 68 (giving X) passage | 5 (1 & 2) | *Nil* | *Nil* | Fever and death | See below. |
| 55 ... ... | 6 (1) | Visible organisms | Not examined | Fever and death | *Nil.* |
| 60 ... ... | 5 (2) | *Nil* | *Nil* | Fever and death | See below. |
| 79 (giving X) | 10 (2) | *Nil* | *Nil* | Fever and death | *Nil.* |
| 66 ... ... | 5 (2) | *Nil* | Not examined | Fever and death | See below. |
| 88 ... ... | 8 (2) | *Nil* | Not examined | Fever and death | See below. |
| 62 ... ... | 6 (1) | *Nil* | *Nil* | Fever and death | *Nil.* |
| 76 ... ... | 8 (1) | *Nil* | Not examined | Fever and death | Slight general oedema. |
| 1 (giving X) | 10 (1) | *Nil* | *Nil* | Death | *Nil.* |
| (63 giving X) | 8 (2) | *Nil* | Not examined | Fever and death | *Nil.* |
| 67 ... ... | 7 (1 & 2) | *Nil* | Not examined | Fever and death | *Nil.* |
| D, passage... | 5 (1 & 2) | Not done | See below | Fever and death | *Nil.* |

NOTE.—Animals 60, 65, and 88 were found after death to be infected with tuberculosis, 60 suffering from generalized disease, 65 and 88 showing tuberculous nodules in the spleen.

*Discussion.*

In discussing the issues raised by the experimental results here recorded, it is necessary to keep in mind the following facts which the experiments appear to have established:

1. The cerebro-spinal fluid of acute human cases of the disease often contains a filter-passing virus which, whatever its nature, is not the meningococcus as such.

2. When injected into monkeys by the peritoneal or subcutaneous route the demonstrable pathogenic effects following injection of filtered or unfiltered cerebro-spinal fluid, of X in pure culture, and of cultures of the meningococcus, always included continued fever or death.

3. In no case did injection of any of the inocula mentioned produce *the* cardinal feature of the disease as it occurs in man, namely, demonstrable involvement of the cerebro-spinal system.

With these facts in view it is difficult to resist the conclusion that the apparent pathogenicity of the meningococcus when injected viâ the skin or peritoneum is due to the hitherto unsuspected presence of X, which must therefore be taken into account, as we shall now show, when the results obtained by Flexner after intraspinal injection are considered.

The various meningococcal emulsions used by Flexner were, as already stated, introduced into the spinal canal of monkeys, injection being frequently followed by collapse and death within a very few hours. In addition to the local pathological tissue changes found after death it is to be noted that recovery of the meningococcus even so short a time after inoculation was by no means invariable. In those cases in which death took place later than twenty hours the meningococcus was only isolated in one instance. In this animal (Monkey 18) positive growths were obtained in some of the cultures sixty hours after the inoculation, although a sample of cerebro-spinal fluid obtained during the first twenty-four hours did not yield the meningococcus. In this connexion Flexner admits that the "amount of multiplication of the diplococcus in monkeys, excepting possibly in the focal abscesses, is, under the most favourable circumstances, small." He expresses

himself, in fact, as "disinclined to believe that in many of the experiments any multiplication whatever took place." He also says: "As compared with the doses which probably determine infection in man, those used to produce the experimental disease in monkeys are colossal." The mere fact of the injections being given by the meningeal route excludes his results as proof of direct etiological relationship of the meningococcus to the disease on account of the readiness with which meningitis can be produced in monkeys by intraspinal injection of other organisms. Another point brought out by Flexner which is highly significant in the light of our results was that after apparent recovery some of his animals died suddenly from causes unexplained by *post-mortem* examination. Moreover, as our experiments show, there is not sufficient evidence that the pathogenicity of Flexner's inocula was due to the action of the meningococcus as such, because this organism was the only pathogenic agent he recognized in, or attempted to isolate from, the emulsions injected, and, as already noted, recovery of the meningococcus was inconstant, even when death occurred a few hours after injection. To sum up, therefore, in the absence of better evidence than that adduced by Flexner in favour of the meningococcus as the direct cause of the disease, his results strongly suggest either that death was due to the action of meningococcal toxin present in the colossal doses of culture he employed or to the unsuspected presence of the agent we have referred to as X.

It is now necessary briefly to discuss the probable nature of X as shown by our own experiments.

At first sight it would appear that X acts as a preformed toxin, and is itself, in fact, a toxin. In so far as the production of continued fever is concerned this explanation cannot be accepted, because, as we have already pointed out, there is no known toxin a single injection of which is directly capable of producing continued fever in healthy man, or in healthy animals. The fever produced in healthy subjects by single injections of a pre-formed toxin is practically immediate, and is always fugitive, as was shown by Hort and Penfold in the case of the commoner Gram-negative organisms. In no case were these observers able to produce continued fever in healthy animals by single injection of preformed toxins. On the other hand, they also found that they were unable to produce continued fever in animals, comparable to that which occurs in disease, unless the organisms injected produced demonstrable disease, and in all cases there was an appreciable latent period, strongly contrasting with the absence of the latent period after injection of preformed pyrogen. The continued fever noted, therefore, in the animals injected, in which a definite latent period of twenty-four to forty-eight hours was the rule, cannot reasonably be explained by the assumption that X is a preformed toxin.

It is, however, theoretically possible to produce continued fever in animals affected, for example, by latent tuberculosis, by the injection of a toxin itself unable directly to produce continued fever. In such case there is perhaps a mobilization of fever-producing organisms induced by the action of a resistance-depressing toxin, such action being only secondary in nature. The continued fever thus produced must be sharply distinguished from the immediate fugitive fever induced in healthy subjects by the injection of a preformed pyrogen, the resultant fever being a purely primary effect. A good example of the secondary effect of a toxic substance, itself incapable of directly producing continued fever, is the following: A monkey which appeared to be healthy, observation for several weeks revealing no rise of temperature above the normal range, was injected intraperitoneally with two slopes of a serum-agar living culture of meningococcus from an acute human case of cerebro-spinal fever. For eighteen days after injection no disturbance of the internal body temperature showed itself, observations being taken twice daily. On the nineteenth day an acute fever set in which lasted till the animal's death a few weeks later. *Post-mortem* examination revealed very extensive acute tuberculosis of the lungs and pleura, with deposits in the spleen and liver. Control injections of non-tuberculous monkeys with serum-agar cultures of meningococci from acute human cases of cerebro-spinal fever showed that the continued fever which may follow injection begins within a day or two of injection, provided that the reaction is not masked by too massive a dose. Hence it is clearly a matter of importance in attempting to determine the nature of X to be certain that only healthy animals are injected therewith. Suspicion, however, would be raised that unsuspected disease existed in the animal under observation if continued fever, as in the case noted, only made its appearance after an unusually long latent period.

In the cases in which death occurred not preceded by continued fever it is theoretically possible that the action of a preformed toxin was responsible. But as these results were obtained by the same type of inoculum causing continued fever not directly due to the action of preformed toxin, it does not seem illogical to conclude that death without fever may also not have been due to preformed toxin. This argument applies more particularly to those cases in which a fall of temperature followed injection with recovery to the normal before death, such fall being as significant of the action of a toxin as a rise, whether the toxin be preformed or the result of a genuine infection in the host.

The primary action, therefore, of a preformed toxin in the production of death, or of continued fever, appears to be discounted, if not entirely excluded.

It is, however, conceivable that the injection of an inanimate toxin might secondarily give rise to continued fever by so depressing the resistance of an animal to infection that parasitic organisms might invade it, or that, quite apart from pre-existing disease, saprophytic organisms (intestinal for example) already present might take on a parasitic phase, and thus produce a systemic infection. To avoid such source of fallacy, in attempting to interpret the sequence of events after injection of a filtrate, or of cultures therefrom, even when containing no visible organisms capable of cultivation in the laboratory, it is, of course, necessary to submit to searching cultural observations the body-fluids of the animal receiving the injection, in the event of continued fever or death resulting. If in such case no visible organisms can be cultivated from the body-fluids it can reasonably be assumed, provided that reliance is not exclusively placed on the results following inoculation of solid media with the unincubated body-fluids, that the continued fever at least is the result of the pathogenic action of a living virus, introduced from without, and is not the result, direct or indirect, of the action of a preformed toxin.

As will be seen by reference to the bacteriological data given in Group V of this communication this test was successfully passed in the case of several animals injected with X, animals in which pronounced pathogenic effects were observed. We feel justified therefore in concluding that the filter-passing agent under discussion is a living virus, and that it was directly responsible for the pathogenic results obtained irrespective of the type of inoculum.

Additional evidence that X is a living virus capable of propagation is afforded by the successful passage experiments cited.

This deduction is, of course, based on the assumption that the conventional criterion of the presence of an invisible living virus is soundly based.

### *Conclusions.*

(Based on intraperitoneal and subcutaneous injection.)

1. The pathogenicity to monkeys of cerebro-spinal fluid from acute cases of cerebro-spinal fever appears to tend to vary inversely as its meningococcal content.

2. The cerebro-spinal fluid in this disease sometimes contains a filter-passing agent which is not the meningococcus, but which is nevertheless capable of producing in monkeys continued fever or death.

3. This filter-passing agent appears to be a living virus capable of cultivation in the laboratory, and of passage through monkeys.

4. None of the pathogenic results here recorded can be reasonably attributed to the action of living meningococci as such, or to the direct or indirect action of a meningococcal toxin.

5. The pathogenicity of cultures of the meningococcus appears to be due to the concomitant presence of the filter-passing virus described.

6. The pathogenic effects observed in the monkeys injected, whether with cultures of meningococci, with filtered or unfiltered cerebro-spinal fluid, or with cultures of X, did not include gross pathological changes in the cerebro-spinal system.

# ON THE LIFE-HISTORY OF THE MENINGOCOCCUS AND OF OTHER BACTERIA.

BY

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THERE are in every science certain admitted facts which do not fit in with current teaching. The tendency of the ordinary worker is tacitly to ignore them; the current teaching satisfies his own particular needs, why therefore worry? But, as a matter of experience, it is by a study of these real or apparent exceptions to the rule that advance is most surely accomplished. This is true of bacteriology as of other sciences.

I cannot give a better instance than that of enteric fever. If in this year of grace there is any bacillus that has firmly established itself as a pathogenic agent it is the *Bacillus typhosus*. The specific reaction between the blood serum of the enteric patient and the bacillus is a commonplace of medical practice: take a culture of the bacillus that has been grown for years in the laboratory, kill it and make a vaccine, and by that vaccine our army in its hundreds of thousands has been immunized against the disease, and yet, although that stock culture, when killed, will cause immunity, when living it will not cause the disease. At least, no one so far has been successful in reproducing the symptoms and specific lesions of enteric fever in man or in any animal by the employment of a stock culture of the typhoid bacillus.

Or take another organism that has played an important part in connexion with "immunology," the bacillus of hog cholera. That is a disease which in swine sets up lesions of the bowel not unlike those of enteric in man. Constantly, in swine affected by the disease, cultures are to be obtained of the *Bacillus suipestifer*, and the blood serum of the affected animals agglutinates the bacillus. By analogy with human typhoid this bacillus ought to be regarded as the causative agent of the disease. But similarly inoculation of pure cultures of the bacillus will not reproduce the disease in pigs. What is more, when the disease is rife the bacillus may be isolated from the stools of unaffected animals. It might be argued that we deal with "carriers," though here there is the additional difficulty that vaccines do not surely confer immunity. To crown all, after the long and honourable career of the *Bacillus suipestifer*, in 1905 Dorset, Bolton, and McBryde proved beyond possibility of doubt that the suggestion of de Schweinitz in 1903 was correct, and that hog cholera is set up by a filterable virus, that if the blood serum of an affected hog be filtered through a "B" or even an "F" Chamberland filter, the filtrate will set up the disease in swine not previously affected by the disease. Note the paradox: The bacillus is constantly found in the intestines and in connexion with the intestinal lesions; it will not reproduce the disease. but this can be reproduced by an agent which will pass through filters which are impervious to forms as large as are bacilli.

This is not an isolated case; Petrie and O'Brien[1] have described an epizootic among guinea-pigs "complicated" by an intestinal bacillus which they cannot distinguish from the *B. suipestifer;* nevertheless they prove that the disease is caused by a "filter passer"; and Wolbach,[2] in his valuable review of the filterable viruses, notes two other diseases—namely, distemper in dogs and scarlet fever in man—in which there is a similar constant presence of definite bacteria, with satisfactory evidence of filterable viruses as the essential causative agents. The observations of the last two or three years appear to add typhus fever to this category.

How is it possible to harmonize these apparently contradictory observations? Here the paper now published by Hort and Caulfeild upon cerebro-spinal fever and the meningococcus* is not merely suggestive, but, I am inclined to think, is the beginning of a revolution in our conception of the life-history of pathogenic bacteria; nay, it may in years to come be regarded as one of the classics of bacteriological literature. This I know is a bold statement.

They adduce strong evidence in support of the view that cerebro-spinal fever belongs to this paradoxical group. That Weichselbaum's meningococcus is intimately associated with this disease is as well established as that *Bacillus typhosus* is pathognomonic of enteric fever. No one with any practical experience of the disease can reach any other conclusion; lumbar puncture followed by detection of the meningococci in the spinal fluid has become the one accepted means of diagnosis. It is true that the number of the meningococci found are not in direct ratio to the severity of the symptoms—that in very malignant cases they may be so sparse as not to be visible in smears, and only to afford rare cultures; nay, I am prepared to admit that cases may occur in which, neither under the microscope nor by our present cultural methods, can the meningococci be discovered. But, admitting this, it must also be admitted that in 99 per cent. of cases clinically recognized as cerebro-spinal fever sooner or later meningococci are demonstrable. And as further evidence of the relationship is the specific curative action of the serum of animals immunized against the disease. If during the first phase of the war the serums employed had little efficacy, those now in use in England and, I may add, in Ontario (by Colonel Connell) are reducing the mortality in a most striking manner.

But as Hort and Caulfeild emphasize, and I think rightly, we cannot by injecting laboratory cultures of the meningococcus reproduce the disease. Even in monkeys they failed to obtain results. We have been content to believe that Flexner has settled this point and by inoculating monkeys had fulfilled Koch's postulates, but, subjecting Flexner's statements to a careful analysis, Hort and Caulfeild show that he only obtained his results by using enormous doses, that after a relatively very short time he was unable to obtain cultures from the cerebro-spinal fluid, and that his results can only be interpreted as demonstrating, not the establishment of a true infection with continued growth and multiplication of the pathogenic organisms, but that large quantities of meningococci, introduced locally, by undergoing lysis with liberation of their toxins, can set up an irritation of the meninges—an intoxication.

To this extent, therefore, the meningococcus comes into the same category as the *B. typhosus* and the *B. suipestifer*.

But these observers make now a notable advance; they show (1) that while cultures of meningococci obtained from the cerebro-spinal fluid of patients do not reproduce the disease, that same fluid contains a filterable virus, a virus capable of passing through so fine a biscuit porcelain filter as the "Chamberland F"; (2) that unlike the meningococcus this virus inoculated into monkeys sets up an infectious process—namely, where it does not cause death within a few days it induces a fever which may continue for five weeks and more—a general disorder without localized inflammation of the meninges; and (3) they are able to cultivate this virus, obtaining, as did Rout and Nocard with the "ultra-microscopic" organism of pleuro-pneumonia of cattle, an evident clouding of fluid media, and after a series of passages outside the body they have been able to inoculate monkeys, induce the characteristic prolonged fever, and from animals so inoculated have regained the filterable virus.

These are very remarkable results. They open, it appears to me, a new field for research into the bacteriology of disease. It is true that these observers have not reproduced cerebro-spinal fever in the inoculated animals; they have, however, set up a definitely infectious disorder with fever, accomplishing more than is obtainable with pure cultures of the meningococcus.

Assuming these observations to be correct—and I have carefully studied the technique employed, the cultures and preparations obtained, and can detect no flaw†—the question arises, What is the meaning of this association of meningococcus and filterable virus? Previous workers with diseases belonging to this group have at most suggested a symbiosis; that the one, the filterable virus,

* A fuller report, with ampler details of the experiments, will be found in the *Journal of the Royal Army Medical Corps* for September, 1916.

† Save, perhaps, that a more sensitive medium of growth might have converted some of their negative results with the cerebro-spinal fluid of patients into positive; this, however, does not vitiate the main argument.

prepares the way for the growth of the bacterial species. Hort suggests, and believes that he has evidence supporting the suggestion, that filterable virus and coccus are two phases in the life-history of one organism.

Have we all these decades been wrong in our faith that bacteria are the simplest of all living forms of life, possessed of asexual multiplication by fission only? (Sporulation as exhibited by some species is, it may be noted, not a mode of multiplication, but of tiding the race over evil days.) May there not be intercalated other phases in the life-history of the schizomycetes? I remember that a quarter of a century ago Emile Roux pointed out to me that, employing every care, not a single tubercle bacillus might be detectable in the sections made from a caseous tubercle, and yet inoculate some of the caseous material into a guinea-pig, and disseminated tuberculosis results. Here is no question of spores, as generally understood. Heat the material to 80° C. for an hour, and it is rendered innocuous. If we dealt with heat-resisting spores this would not be the case. As a matter of fact, small Gram-positive granules can be seen in such caseous material, very similar to Much's granules in Hodgkin's disease, sometimes isolated, sometimes in short chains.

In 1901, if my memory serves me aright (I am away from my books), Abbott, Nicholson, and I published a paper in the *Journal of Experimental Medicine* that bears upon this point. We found in the liver and gall bladder in cases of hepatic cirrhosis minute granules, generally in pairs, sometimes in rows of three, so small that they could only be defined by the $\frac{1}{15}$ in. immersion lens. In the bile we found larger (but still small) diplococcoid bodies, and making cultures of these we obtained in case after case the development of *Bacillus coli*. We entitled our paper "On the diplococcoid form of the colon bacillus." Some few years later Wolff-Eisner to a large extent confirmed our findings. Looking at preparations of Hort and Caulfeild's cultures of their filterable virus the appearances reminded me vividly of my elusive minute bodies. I admit that I regarded my bodies as degenerative and due to the action of the cells and body fluids upon the organisms. But it is within the bounds of possibility that, as with many of the protozoa, some bacteria, at least, may afford an encystment stage, followed by the liberation of minute elements which in turn may grow into larger forms which now undergo asexual multiplication. This possibility must now be tested, and these, or other observers, must study other diseases and pathogenic organisms, repeating Hort's method and keeping this possibility constantly in view.

I say this knowing full well that the academic bacteriologist is apt to look with suspicion upon Dr. Hort's work, because Hort is not of his class, but a Harley Street consultant, whose heterodox but most suggestive papers of the last few years have been the outcome of laborious hours in his own laboratory, snatched from his other work. I admit that I have had the same suspicions. Just as to become an expert violinist it is proper to begin to play the fiddle in early youth, so it is almost impossible for a man who begins to be interested in bacteriology in his maturity to master the technique. He may have ideas, may devise admirable apparatus and modes of approaching his problems, but he lacks and must lack manipulative dexterity. The course which seemed to me best calculated to remove this danger and to determine the truth was for Dr. Hort to associate with himself an independent technician of proved ability. This Dr. Hort did when he asked the D.M.S. Canadians to attach Captain Caulfeild to Addington Park for this special investigation, under the auspices of the surgeon-generals of both navy and army, Captain Caulfeild having been Demonstrator in Pathology of Toronto University, later Assistant in Experimental Medicine under the Chair of Medicine in the same university, and having published valuable work upon immunity and the tuberculin reaction in tuberculosis. The work thus demands and must receive consideration. After all it is the peculiar glory of British science that so many of its greatest triumphs have been achieved outside the schools by Priestleys, Daltons, and Darwins, and other educated amateurs.

REFERENCES.

[1] *Journal of Hygiene*, 1910, vol. x. [2] *Boston Med. and Surg. Journal*, 67, 1912, p. 419.

# Reviews.

## THE UMBILICUS.

DR. CULLEN has added one more standard volume, the *Embryology, Anatomy, and Diseases of the Umbilicus*,[1] to the series of publications issued by the Johns Hopkins School of Medicine. It contains full quotations of the records of other observers and reports of cases occurring in the experience of the author and his colleagues. The illustrations are of high merit. Mr. Horn, whose brilliant work is so familiar to all who study the works of Drs. Kelly and Cullen, unfortunately died before he could prepare some of the earliest drawings, but Dr. Cullen has secured the services of Mr. Max Brödel, Director of the Department of Arts as Applied to Medicine in the Johns Hopkins Medical School, and rightly awards to that artist the credit of playing the principal part in investigations throwing light on the development of the umbilicus in the embryo, and on its variations in the adult, demonstrated by sixty sketches taken from patients in the wards of the Johns Hopkins Hospital. Attention may be particularly directed to an excellent drawing, representing a dissection of the umbilical region of the adult viewed from within, and to others of umbilical hernia associated with pendulous abdomen, and the stages of the radical operation for its cure. Dr. Cullen's chapters on umbilical hernia, umbilical infections, and Meckel's diverticulum and the complications to which it may give rise, will be studied with interest by surgeons. The author informs us in his preface that his book is founded on researches commenced twelve years ago in association with a case of cancer of the navel under his personal observation, and the part of the book dealing with tumours is very good. He followed up numerous after-histories, corresponding in some cases with observers in this country. He also communicated freely with English writers when engaged on his numerous chapters on the urachus, a subject about which much has been written during the past thirty years by British gynaecologists. Dr. Cullen has quite rightly saved from oblivion Wutz's monograph on urachal cysts, published in *Virchow's Archiv* in 1883, and he has shown much discretion as to the acceptance of reports of large non-infected urachal cysts. The pathology and treatment of patent urachus is discussed at length, and Dr. Cullen has very prudently quoted Dr. Edward Ill's warning, which is most important for the general surgeon to remember whenever he chances to come across this condition. Should the lower part of the urachus be uninvolved at the time of the operation, being reduced to an apparently impervious cord, it is not safe to treat it by ligature, as there is often a minute canal lined with epithelium in the cord; the ligature may not destroy the epithelium, and so the canal may open up from below after a time and a bad urinary fistula will be the result, an accident already recorded in the history of surgery.

## NOTES ON BOOKS.

DR. GANT'S book on the various diseases of the gastro-intestinal tract[2] is a highly meritorious compilation, based on the extensive literature of the subject and the author's own experience. There is very little in it about diseases of the stomach; the title-page refers to the gastro-intestinal tract, the title on the book's back mentions intestinal diseases only, and the text is concerned almost entirely with the one subject of diarrhoea. The author goes in strongly for classification and subdivision, far more strongly than practical experience would justify; thus his "etiologic classification of diarrheas" on pp. 22 and 23 contains something like 150 classes and varieties of diarrhoea. Many of the illustrations are excellent, though not a few have suffered from too enthusiastic retouching. There is a great deal of useful information in the book, but it is often presented in unattractive forms and buried beneath a mass of verbiage. Compressed to half its

[1] *Embryology, Anatomy, and Diseases of the Umbilicus, together with Diseases of the Urachus.* By Thomas Stephen Cullen, Associate Professor of Gynaecology in the Johns Hopkins University. Philadelphia and London: W. B. Saunders Company. 1916. (Sup. roy. 8vo, pp. 690; 7 plates, and 269 figures. 35s. net.)

[2] *Diarrheal, Inflammatory, Obstructive, and Parasitic Diseases of the Gastro-Intestinal Tract.* By S. G. Gant, M.D., LL.D. Philadelphia and London: W. B. Saunders Co. 1915. (Roy. 8vo, pp. 604; 181 figures. 25s. net.)

present length, rewritten with more light and shade and less emphasis on negligible detail, and rearranged, Dr. Gant's book would be a good and serviceable contribution to the study of diarrhoea.

The third edition of Messrs. MOOR and PARTRIDGE'S *Aids to Bacteriology*[3] contains a great deal of information in a small compass, and has been brought up to date by the inclusion of much that bacteriologists have learnt from experience in the trenches and battlefields of the war. The volume may be regarded as a favourable specimen of the class it represents.

[3] *Aids to Bacteriology*. By C. G. Moor, M.A.Cantab., F.I.C., Captain 1st London Sanitary Company, and W. Partridge, F.I.C. Third edition; Students' Aid Series. (Fcap 8vo, pp. 286. Cloth, 3s. 6d. net; paper, 3s. net.)

## MEDICAL AND SURGICAL APPLIANCES.

*Wristlet Ligature Holder.*

MR. PERCIVAL P. COLE (London) writes under date September 27th: My wristlet ligature holder was exhibited at the Congress of American Surgeons in July, 1914. I had never seen Mr. Victor Bonney's device (BRITISH MEDICAL JOURNAL, September 16th, p. 393) until a fortnight ago. The single-handed knot is such an elementary point in technique that mention of it seemed to me unnecessary.

## THE ARMY MEDICAL SERVICE.

BY

A MEDICAL OFFICER IN CHARGE OF AN INFANTRY BATTALION.

IN view of the very general discussion on the present position of medical men, some views from one of its members on the subject of the corps which claims their services may be of interest to those about to join it.

Those who regard them as superfluous may conjecture that they are written in an interval of spare time and may comment on the subject of spare time in the R.A.M.C., ridiculing the "demands for medical men in the army," perhaps even offering generous sympathy with some "unfortunates" who are compelled to waste their valuable time and intelligence in ministering to the crude ailments of a footsore regiment.

A medical man on taking a commission must be prepared to become a specialist in a subject which is entirely new to him, having a wide scope, and as remote from the nature of his ordinary routine of work as the subjects of public health, medical jurisprudence, etc., are from that of a newly qualified medical practitioner. The comment that is here sometimes made is that it is a waste of a medical man to employ him in a capacity which could equally be fulfilled by a man not so qualified. Yet no one criticizes the regulations which, in civilian life, require that before one may specialize in, for example, public health, he must have a medical qualification as a necessary preliminary. It is equally true of the duties of an army medical officer that, remote as they are from the subject of pure medicine, they could only be efficiently fulfilled by an officer who possessed a preliminary medical qualification. A field ambulance, for example, in modern warfare, where the paramount question is the proper transport of wounded away from the sphere of action, of which the familiar examples of rapidity are an outstanding testimony to the efficiency of organization, could no more be efficiently run by "combatant" officers than an infantry battalion could be led to fame and glory by the staff and residents of a general hospital!

The medical officer, new to his work, must be prepared to learn, in a comparatively short time, an entirely new and wide subject, and if he comments that his skill and previous experience are thrown away, he might bear in mind that his case is not isolated; he is not the only person who has had to adapt himself to new and unforeseen requirements. If a man who, not long ago, gave five or six years to the study of law, has had to abandon his practice to render service as a combatant officer, he does not necessarily demand in return that he shall be employed in the army only in the capacity of prosecutor or prisoner's friend on courts-martial! The circumstances are not so very dissimilar, with the difference that the medical officer has considerably better pay, and as a rule (not of his own choosing, but of necessity) a much more comfortable "billet."

I do not propose to enter here into details regarding the duties of a medical officer, but if, before consenting to become one, the officer will accept that he must, for the time being, put aside his technical knowledge of medicine (for the very simple reason that military exigencies cannot, in the nature of things, provide scope for its employment) and be prepared to adapt himself to the new demands made on him, he will probably find his way smoother and will evolve into a more efficient officer. It would be hard to set a strict limit to these possible demands. At one time he may be in a general or stationary hospital, when he will find that his duties do involve what is commonly implied by the practice of medicine and surgery (though even here with inevitable limitations), but the number so employed is relatively not large, and the younger man will find that he does not remain here long. He will soon find himself probably in a field ambulance; he will one day—probably soon—be halting a section of his men in a new locality, when a brigade of artillery may come at full pace round the bend of the road; he will have to pretty sharply move his men, by word of command, out of the way, and if he has ignored to acquire some elementary knowledge of drill when the opportunity was provided him in an officers' class, he will only succeed in putting his men in a position of chaos (if even that) and himself into one of ridicule.

He may be given a map indicating the firing line, with instructions to advance for collection of wounded, and to take also his ambulances along a given road to a point as far as is safe, in his judgement, for them to be brought; if he has acquired the elements of map-reading, he will probably halt his wagons in time at a suitable point; if he has not, some hostile shells (we are speaking of modern warfare) may be the first reminder that the inconspicuous contour-figures on the map have a significance, and that, had he not omitted previously to interpret the reading of these figures in the area concerned, he might have been less crudely forewarned that he was bringing his ambulances a hundred yards further than he should, on to the top of a hill between which and the enemy's guns nothing intervened to obstruct their view.

After a time with a field ambulance he may be sent up to fill a vacancy as regimental medical officer. It may be that he considers himself an excellent surgeon, but he will be a more efficient R.M.O. if he puts this consideration aside for the time being; and for this you must blame, not the authorities, but the unknown God of War who devised that the results of hostilities between armies should be what they are.

The duties of a regimental medical officer during an action are elementary, and no more than are indicated by the dictates of common sense; but, simple as they are, they could not be efficiently conducted by any one other than an officer with a registered medical qualification. Incidentally, the knowledge that a medical officer is present during an action may lend indirect moral support to troops; it is very common for the soldier to be obsessed with a fear of death from haemorrhage, in spite of the fact that one so seldom sees severe bleeding from gross battle wounds.

When his regiment is not in action the regimental medical officer must be prepared, apart from routine instruction of his stretcher-bearers and the usual supervision of general sanitation, to advise, *in anticipation*, on the course of procedure to be adopted in any matter which directly or indirectly affects the health of the whole unit or its individuals. He may one time be asked what is the water-holding capacity of an ordinary beer barrel; whether a given drain in some billet is efficient or not; what was the possible source of infection in an outbreak of disease, and what steps he would take to counteract its spread—there are many possible demands on his initiative or resource. When he has established his position in a unit, and when he has gained the confidence of experience, his energies may be directed towards enlightening the company officers on their own obligations in this direction. Tactfully used, his position is a strong one, and the work is straightforward. Will any who would criticize this routine suggest who but a medical man should fill this post?

Just occasionally one meets the isolated case of the man who grumbles whatever his lot. But excluding such cases, there remain men who are not of the ordinary—men who can claim to be given scope for special work. It is true that such a man is out of place in the fighting line, not so much from the personal point of view that he is too

superior a being to be subjected to the risks of a bullet (your regimental adjutant was possibly a highly intelligent and capable manager of a large business concern not so long ago, but nevertheless goes over the parapet with his battalion) as that his training and experience would be wasted where there is no scope for its employment.

There are more ways than one in which a "specialist" may claim what he desires. One is to go to those who control things at the head of affairs and, representing what a valuable person he is, demand that he shall receive a commission with the understanding that he shall do this or that particular or specified work, perhaps even a guarantee to provide him a sufficiency of material on which to devote his services! The fact is often overlooked that in army work it is almost impossible to anticipate what unforeseen demands may or may not occur from one day to another, and it is well-nigh impossible to guarantee beforehand that there shall be a sufficiency of certain work always ready to fall into the hands of those who want it.

While he who calls himself a medical officer must be prepared to adapt himself to general duties during intervals when circumstances do not provide scope for the work of his choice, nevertheless if, on joining, he forgets for a short time any claims to superiority, and is willing to go through the rudiments of a preliminary general military training which is provided at various centres, he will generally find that his wishes or his claims in the long run are not overlooked, granted always that military circumstances call for such recognition; when they do, he will be ready at hand. It is on similar lines that if you are to be prepared to meet all possible contingencies there must be times when numbers are in excess of requirements; and because these times occur at varying and spasmodic intervals, when the medical officer finds he has little to do, it is no answer to say that there are too many medical officers.

An infantry battalion finds itself at one time on a "slack" part of the line, or behind it; the cavalryman may never have seen it, or may perforce have to pass an easy time, waiting in anticipation at some quiet part; at times the ordnance and supply services, in one area, though prepared, have less than they might wish to do, while in another, according to the tide of events, their energies are taxed to the utmost of available resource. Military operations cannot slide along with the even smoothness and regularity of a business concern. The man who fails to recognize that such periodical spells of inactivity are inevitable in certain sections takes as narrow a view as the short-sighted gentleman who thinks that every enlisted man should be in the front-line trench. Although I think that the entire interest of active warfare is lost to the man who does not reach the front, I have seen enough of things to realize that the "front" is a relatively small component in the scheme of a campaign; indeed, without the vastly greater factor—the foundations behind—there would be no "front."

This recalls the fallacious assertion of many that the rank and file of the R.A.M.C. should be composed of men medically unfit for general service! It will generally be the case that the advocate of this view would be the very first to make an outcry if, in the stress of a great action, he did not receive all the medical attention which he nevertheless assigns to himself as his due. Even so, this mistake is not uncommon amongst quite intelligent people, and a medical officer will not be long with a unit before he runs up against it. An officer criticized with more candour than grace the men of the R.A.M.C., complaining that there were "numbers of fit men sheltering under its protection," and refused to see reason in any other view. My answer was that if it ever transpired that he met with mishap, and I had charge of the men on whom he was dependent for medical "aid," supposing he was one of ten, I would see (after due consideration of the urgency of his condition) that he should be the tenth to be dealt with, and should have apportioned him for his benefit the least efficient of those men. Whilst he was being carried from an advanced dressing station along a shelled road for some few miles by two or three stretcher-bearers who were "medically unfit," he would doubtless have ample time (and inducement) to reflect as to the sanity of his views. Strangely enough, the same person, a week after this little discussion, being indisposed, raised not the slightest objection to one's sending him back for a period, that he might avail himself of the hospitality of a fully equipped field ambulance. An unfit man is as much of an incumbrance in the R.A.M.C. as he is, say, in the infantry, and I often wonder if this is fully realized by the recruiting medical officer at home, who—more from generosity than ill will—was apt in the earlier stages of the war to dispose of his doubtful recruits as "fit for the R.A.M.C."!

There is, I think, no branch of the service in which recognition is paid to individual wishes by those at the head of affairs to a greater extent than that which obtains in the Medical Service. The R.A.M.C. officer goes to a centre for preliminary training, there to undergo a short elementary course in subjects of which — however irrelevant they may appear at first sight—it is essential he should acquire the rudiments before he can be capable of dealing with the varied situations he may possibly find himself called upon to meet. Not the least interesting of these acquirements will be the rudiments of horse-riding.

Whilst at the training centre he will probably be asked what are his inclinations—to remain in a field ambulance (there are many worse billets in warfare), to go to a regiment, to go to a hospital, or to go on a waiting list to proceed independently abroad; if abroad, would he prefer to be sent to the East, or elsewhere—if the former, he should send in his name in readiness for demands.

On arriving abroad, particulars of qualifications are registered and individual wishes with regard to special work are generally complied with, provided there is a vacancy calling for it. It is only natural that the numbers so available are usually in excess of the requirements, so that most commonly the officer passes from the base up to lines of communication, probably to a stationary hospital. Here he remains, at any rate for a time; he may be offered the choice of medical or surgical work; to quote a personal instance, one was given the option of accompanying a senior sanitary officer on his tour of inspection along lines of communication, with a view to acquiring some ideas on a subject which might prove useful when further up the line. After a period spent in this manner, demands may come down for some officers to be sent further up, and in such cases it is not uncommon to find an opportunity thus afforded of taking some choice as to one's destination. So he may pass from lines of communication into one of the armies, in all probability first to a field ambulance. When so stationed, whatever the nature of his medical duties may chance to be, he has an opportunity of getting an insight into the trend of military operations over a considerable area, from a somewhat unique perspective. When he has gained some experience here, he will doubtless have every opportunity of claiming, should he want it, the post of regimental medical officer, and as the ambulance is associated with various regiments, even at this stage there is generally the possibility of selection.

It will thus be seen that when one reaches the front line one has done so only through a series of successive stages, allowing of time to acquire what knowledge may be necessary, and also an opportunity of exercising some choice in the matter of one's destination. Such concession to individual desire, if universal, would be not merely harmful, but impossible, and I am not losing sight of the fact that the routine of medical administration in warfare necessarily permits of this flexibility in a special branch of the service more easily than perhaps would be possible in other branches; but it is not obligatory—the more in times of general service.

I suggest a comparison. A medical officer is, say, six to nine months with a regiment in the trenches; some day an order might come that he will be replaced by another. Should it be rumoured that he had requested a change no one criticises his step or questions his reputation; it is in the nature of things to accept that he was at liberty to take such a step. After a long period there is some monotony in the routine of regimental medical work.

The infantry officer, by contrast, goes through his preliminary training, and as soon as efficient is told to "go there"; there is no question but that he does go. Then it is only a matter of waiting, but it will come—sometime he is wounded. He goes home to recover, and soon enough he is out again, and so it continues. One day the cycle is interrupted—he does not go back.

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## SCIENCE AND LITERATURE IN EDUCATION.

The discussion on the relation of science to the State and to education, which has exercised a powerful influence for good on public opinion, seems to be in danger of losing itself in what is really a side issue. A generation ago polemical writers were never tired of discussing the conflict between science and religion, but most people nowadays realize that there is no real conflict because they are concerned with two different aspects of man's nature. Now there is an inclination in some quarters to beat up a conflict between science and literature. Sir Clifford Allbutt, who some years ago wrote an illuminating book on professional education, has now, in some letters to the *Times Educational Supplement*, taken the matter on to different ground. Sir Arthur Evans in his address to the British Association repeated the lament that the British, or at any rate the English, were sunk in intellectual apathy. It is much the same lament as Matthew Arnold uttered nearly two generations ago, but, Sir Clifford Allbutt asks, What, thus stupefied by nature and by education, have Englishmen been doing? His answer is that this stupid or intellectually apathetic race has mastered half the world, has been the tamer of realms of wild or disorganized nations, has led the way in invention and in triumph over brute nature, and, with France, has been the chief maker of modern civilized society. And he adds: "We are beginning to hear that for efficiency, method, elasticity, and initiative the British conduct of this great war is astonishing Europe. That such is the case in the medical service I know." Is there not, then, he argues, some riddle which needs more thinking out? His answer is so interesting an excursion in national psychology, contains so valuable a warning for the future, and has so direct an application to education for the medical and other scientific professions, that we will attempt to state it. He begins with a parable of the skilled workman, who has by his many years of practical experience acquired a sensitiveness of hand, a play of hand and sense, a fineness of touch, a rapidity of adaptation and almost incredible dexterity. He cannot go far in the principles of mechanics, but can tell unerringly what, in his own line of work, a thing is "good for." If a scheme be proposed to him he will not argue about it, but will carry the thing to his bench and try it, and his decision is either "it will not work," or "it will work." The average Englishman seems intellectually apathetic, not because he is not interested in his calling, but because he is possessed, too closely beset, by the question whether or no a thing will work there and then. "In order to think he does, and he does in order to think." He realizes that in every transaction with man and material, contingencies are so many and so complex that main principles are overlaid by them; unwisely, therefore, he is tempted to scout the principles.

Broadly speaking, in the history of the works of man art has preceded science; first, the thing doing or done, then, in the second and following order, the analysis of it. The concrete first, the abstract afterwards, often long afterwards. This is the English boy's instinct: art first, then science. His first stage is to do and to make, and from that he should be led to analysis and the separation principles. In teaching English boys the concrete must come first, the abstract afterwards, a lesson they try to teach their masters; yet in customary classical teaching the boy is started upon remote and subtle abstractions. "The wretched boy, so taught," Sir Clifford Allbutt says, "cannot, after ten years' instruction, say in Latin, 'Get up and open the window.' Yet a few generations ago every grammar school boy, gentle or humble, could make some discourse in Latin." The system, it appears, has been put to the test by Dr. Rouse at the Perse School, Cambridge, where, in the Latin lesson all the text, exposition, correction, and illustration, are carried on in vernacular Latin by masters and boys, and the boys, "finding themselves not passive vessels only, but doing a living thing, are no longer 'apathetic,' but as keen as terriers."

To this as a concrete matter let us add that it is singular for persons who proclaim the intellectual advantages which flow from an education founded on Latin and logic to accuse those who maintain that science should form part of the training of an educated man at school and college of desiring to belittle literature. They are entitled to claim that a classical education is a means to an end—the end being the training of the mind—but they are not entitled to claim that it is the only means of attaining the end, more especially when their methods of teaching classical languages are proved to be so defective and to lack the inspiration which scientific training gives. At any rate, let us continue to claim that literature is the noblest recreation for the mind, and that one of the justifications for retaining Latin and Greek in the ordinary curriculum is that a working knowledge of them opens to us the storehouses of the past.

## OVERTIME AND SUNDAY LABOUR.

The Health of Munition Workers Committee, in its fifth memorandum, recommended that the average weekly hours of labour, including overtime, should not exceed sixty-five to sixty-seven for men and sixty for women. The Committee suggested that it might be desirable to distinguish between different kinds of work, but did not make any specific recommendation, owing to lack of data on which definite conclusions could be founded. Since the publication of this memorandum the Committee has secured the services of several investigators who have been engaged in making detailed inquiries into output in relation to hours of labour. It has now issued as an appendix to Memorandum V a report by one of these—Dr. H. M. Vernon, the distinguished Oxford physiologist—but reserves its final opinion until the work of the investigators is completed. We may, however, congratulate Dr. Vernon on a very valuable series of observations, for there can be no better means of studying fatigue than the hourly and daily output of workers engaged as they now are, with their heart and soul in the work, and their earnings unrestricted.

The first object of the Committee is to secure the maximum output so long as the war lasts. This can be obtained only by maintaining the health and physical efficiency of the workers. Questions of extra cost of output, or of optimum hours yielding the maximum enjoyment of life by the worker and the best development of his character, have to be left out of consideration during the war. There were no trade union restrictions upon output in the munition works investigated by Dr. Vernon. A complete series of output data were obtained for one hundred women, used to the work, over a period of twenty-four

weeks engaged in the moderately heavy labour of turning fuse bodies. Standing at capstan lathes all day, the operations require close attention and some delicacy of manipulation, so that no relaxation of effort is permissible during the actual turning.

The actual hours of labour worked were at first 68 to 69; in the four weeks following the Christmas holiday there was a 12 per cent. increase of total output, which Dr. Vernon attributes to the after-effect following the holiday. As might be expected, there was a typical rise in hourly output just before the holiday and a great fall immediately after it. In the last part of the period of observation shorter hours were established, 60 hours being actually worked. The total output nevertheless was 8 per cent. greater than in the period when the hours were 68 to 69. Dr. Vernon puts forward convincing evidence that the increase was not due to greater skill on the part of the operatives, or to any change in the nature of the work. One group of seventeen working 51.8 to 62.6 hours a week had an output 18 per cent. greater than fourteen operatives working the old long hours. When both groups worked the long hours their output was identical. Women given hours too long in relation to the work they had to do instinctively kept worse time, and took occasional half-days off; other women engaged in the same factory on light sedentary work showed only half as much broken time. In the case of nine youths engaged in heavy labour (sizing base plugs) a reduction in the hours from 68.3 to 60.9 was accompanied by an increase of output of 38 per cent., an astonishing difference, which Dr. Vernon attributes to the fact that they were seriously overworked by the longer hours. In the case of twenty-seven men engaged in the heavy labour of sizing fuse bodies the reduction of hours from 61.5 to 55 or 56 was accompanied by a 10 per cent. increase in total output. On the other hand, the output of twenty-three men engaged in the moderately heavy labour of boring the powder chamber of shells was increased by raising the hours of actual work from 47.8 to 59.7. In the case of youths doing the light work of boring top caps the reduction of the hours from 75.6 to 59.4 gave a total output 15 per cent. less, so that in this case the terribly long hours seemed to be necessary to secure the maximum output, but, it cannot be doubted, at the expense of the youth in after-years. The results of Dr. Vernon's investigation together suggest the following maximum hours a week—For men doing very heavy work 56 or less, doing heavy or moderate 60 or more, doing light 67 or more, and doing very light 75. For women the maximum should be: Moderate work 60 or 56 hours, light work 62, very light work 65.

The Health of Munition Workers Committee, in its first memorandum issued last year, stated that the evidence it had then received led it strongly to hold that if the maximum output is to be secured and maintained for any length of time a weekly period of rest must be allowed, and said that it considered that the "discontinuance of Sunday labour should be of universal application, and should extend to all classes of workers except where the work must necessarily be continuous," when special arrangements would be necessary. In a memorandum[1] on "juvenile employment" just issued, the Committee states that the arguments in favour of a weekly period of rest apply with special force in the case of boys and girls, since they are less fitted to resist the strain of unrelieved toil, and are more quickly affected by monotony of work.

[1] H.M. Stationery Office, Cd. 8362, price 1d.

A second interim report by Professor Stanley Kent, of Bristol, on his investigations of industrial fatigue, fully bears out this conclusion. His first report, issued about a year ago,[2] dealt chiefly with methods employed. The new report[3] relates and discusses the results obtained. They confirm his previous conclusion that there is progressive development of fatigue throughout the week, and he advances evidence that the power of recovery is diminished. He found that overtime might lead not to an increase, but, owing apparently to the extra fatigue it produced, to an actual diminution of output—a conclusion identical with one of those reached by Dr. Vernon. Professor Kent points out that a progressive diminution of the power of the worker to resist fatigue or to recover from it if present, afforded a strong argument against Sunday labour. In normal times the lessened efficiency found towards the end of the week is remedied by the rest obtained on Saturday afternoon and Sunday. With Sunday work the rest is inadequate and the condition of fatigue becomes permanent, and is, in fact, aggravated week by week until either the worker breaks down or, as is more probable, equilibrium is brought about. The production of what Professor Kent calls a condition of equilibrium through which the cumulative effects of fatigue are averted depends, he says, upon a number of factors, but the only one which can be varied quickly and often is the degree of application of the worker to his task. The adoption of this means of adjustment may be conscious or unconscious, but Professor Kent appears to hold that if the hours are twelve instead of ten, the closeness of application will be less throughout the whole period. He summarizes his conclusion under this head by stating that if, in a factory where the operators are working as assiduously as possible, overtime be introduced the change will involve extra strain; reaction will take place, application will be relaxed, and the fatigue produced in each hour lessened in consequence. It will develop at a slower rate for a greater number of hours a day, and recovery will be less perfect. The consequences will be that the general efficiency of the worker will be lessened. Where the output is controlled mainly by machinery the loss may be small, but where it depends more especially upon the worker it will be great. The general conclusion is that overtime labour is physiologically and economically extravagant, and frequently fails in achieving its object.

The Ministry of Munitions has profited by the result of these scientific inquiries, for it announced at the end of last week that it had been decided, so far as possible, to prohibit Sunday work in establishments in which munition work is carried on. Accordingly, as a first general step, a general instruction has been issued prohibiting, as far as possible, Sunday labour throughout the north-east coast. Exceptions are made in cases where the work is necessarily of a continuous nature, or where the repair to plant and machinery can only be performed during the week-end.

## THE SALE OF A PRACTICE.

THERE are so many personal and local considerations affecting the sale and purchase of a practice that general questions sometimes receive inadequate attention, and we propose to deal here with one point the importance of which has recently been accentuated. We have reason to believe that it is often not understood, and more frequently still lost sight of, when an agreement for sale is prepared. We refer to the

[2] BRITISH MEDICAL JOURNAL, October 2nd, 1915, p. 512.
[3] H.M. Stationery Office, Cd. 8335. Price 1s. 6d.

possibility that, unless due precaution be observed, income tax may be deductible from the payments made for the transfer of the practice.

There appears to be an increased tendency, possibly on account of the capital stringency arising from Government expenditure, for the purchase price of a practice sold in present conditions to be spread over a short term of years. Such an arrangement has much to commend it, especially from the point of view of the purchaser, and provided that it leaves the other liabilities of the contracting parties unaffected, it probably gives the maximum amount of satisfaction to both; but unless the condition be fulfilled the agreement may be found to inflict unexpected hardship on the vendor. The point can be best explained by means of an illustration. Let us take the simplest case first, and suppose that it be agreed that the value of the practice is £2,000, and that this amount is to be paid to the vendor in one sum. It is clear that this is purely a capital transaction, and it would be so treated by the income tax authorities; the purchaser could claim no allowance for his outlay of £2,000, and the vendor would not be liable to account for tax on the amount, or on any part of it. Now let us suppose that the agreement for transfer simply provides that, in consideration of the fact that the vendor enters into the usual undertakings with regard to introducing the purchaser to his clients, etc., the purchaser covenants to pay a sum of £400 in each of the following five years. In such a case, although the facts—apart from loss of interest on outstanding purchase moneys which is immaterial to the argument—are not essentially dissimilar, the purchaser would be entitled to deduct income tax from the payments made to the vendor, on the ground that they are "annual payments" within the meaning of the income tax Acts. At the high rate of tax in force at the present time—and, we may add, apparently contemplated for the future—it is obvious that such a right of deduction would confer a substantial advantage on the purchaser at the expense of the vendor, and would materially affect the price ultimately paid for the practice. The purchaser would, in effect, be obtaining an income tax benefit equivalent to the deduction of the purchase price as a professional expense, and the vendor would be mulcted in tax on what is in essence if not in law a "capital" receipt. The revenue would not appear to be affected, except possibly to some small extent according as the vendor or the purchaser pays tax at a higher rate. Such cases have occurred within our knowledge when neither of the contracting parties had anticipated or desired such a result, and, though the matter is capable of settlement by mutual consent—and, in passing, it may be said that that generally implies a compromise which, in the nature of the case, cannot do full justice to the vendor—it is more satisfactory to avoid the difficulty altogether.

The method by which this can most conveniently be done is to earmark the payments in such a manner that a court of law would, from a perusal of the agreement itself, regard them as constituting payment of capital by instalments. For example, if the contracting parties agreed that the purchase price of the practice should be £2,000, but that the purchaser should have an option of discharging his liability by payment of five annual instalments of £400 each, with or without interest at, say, 5 per cent., or, if desired, alternatively by payment of, say, one-third of the gross or net receipts of the practice until the £2,000 be entirely paid, then the payments would, we are advised, be "earmarked" in the manner required to identify them as capital. Of course, if interest be provided for in the agreement and paid, it would be liable to tax, but that would not affect the main question as to the deduction of tax from the sums representing instalments of the purchase price.

We have treated the matter as referring to the sale of a "sole" practice, but of course the observations apply equally to an agreement for the sale of a share in a partnership practice.

Seeing that the question is one which involves a source of substantial but avoidable difficulty, it is to be hoped that it will be borne in mind by all practitioners who may in future be concerned in the preparation of any agreement for the sale of a practice.

## MEDICAL REMUNERATION UNDER THE INSURANCE ACTS.

In the Supplement this week will be found printed in full what must be regarded as the Insurance Commissioners' official explanation of the present system of remuneration of panel practitioners in England and Wales. The document, which will be known as Memo. 229/I.C., is being sent to the secretary of every Panel Committee and to each representative appointed to attend the Conference of Local Medical and Panel Committees in London on October 19th, where it will come up for consideration. For months past the Editor and the Medical Secretary have been almost inundated with letters from practitioners having complaints to make about the payment of remuneration under the Insurance Acts, and though practically all the explanations given in the present document have been in a somewhat disjointed way published before, this is the first official connected account of the elaborate system the Commissioners have found it necessary to set up. It will be seen that the subject is dealt with under three main heads: (*a*) The collection of funds by the Commissioners—that is, the formation of the central medical benefit pool; (*b*) the distribution amongst Insurance Committees of the pool thus formed; and (*c*) the distribution by Insurance Committees to individual doctors. The method adopted under each of these heads is explained, and the modifications which the war has made necessary are described, while a hint is also given that still further modifications may be found necessary as the effects of the war are further developed and made manifest. The importance of the document is obvious, and while it will undoubtedly explain many anomalies which have caused a feeling of dissatisfaction among panel practitioners, it is equally certain to bring out numerous criticisms and suggestions. We suggest that every panel practitioner should regard it as a duty to study the document carefully, and retain it for future reference.

## CONFERENCE OF REPRESENTATIVES OF LOCAL MEDICAL AND PANEL COMMITTEES.

A conference of representatives of Local Medical and Panel Committees, called by the British Medical Association, will be held at the Connaught Rooms, Great Queen Street, London, W.C., on Thursday next, October 19th, at 10 a.m. Dr. J. A. Macdonald will preside. The business of the conference will fall mainly into the following divisions: (1) discussion of the report of the Insurance Acts Committee on the resolutions passed at the last conference, and of the action taken by the Association since that time, on behalf insurance practitioners; (2) discussion of the present method of remuneration for medical attendance under the Insurance Acts; (3) discussion of the new regulations for 1917; and (4) discussion as to future organization for the protection of the interests of the medical profession in relation to the Insurance Acts.

## THE RECRUIT'S HEART.

The condition of the recruit's heart and the cardiac affections to which soldiers are liable have recently aroused so much discussion, and so many accusations of

carelessness and insufficient examination have been levelled against the recruiting authorities, that it may be of interest to describe the mechanism provided in London to ensure that the recruits presenting themselves at the various stations are thoroughly examined and accurately classified. In the early days of the war, when all machinery had to be hastily improvised, some men may perhaps have been accepted or rejected on the opinion of a single examiner. This is no longer possible. The London area has been divided into districts, in each of which a carefully constituted board of skilled medical examiners deals with the recruits presenting themselves. No man is passed or rejected upon the judgement of a single individual, but only on the considered opinion of the board as a whole. Some surprise has been expressed that men who have already been examined in the earlier days should be called up for re-examination. The public do not seem to have grasped the fact that the present system has been devised as much in the interest of the individual as of the nation. Of course, in a science so complex as that of medicine, doubtful cases must occur where the skill of the expert is of inestimable value in elucidating difficult points. The War Office, realizing the assistance that specialists could render, have not hesitated to avail themselves of their help in different branches of medicine and surgery, such as ophthalmology and cardiology. For the latter branch, as early as last February, arrangements were made with the National Hospital for Diseases of the Heart to subject those men about whose cardiac condition the recruiting medical boards might be in doubt to an exhaustive and searching examination, taking advantage of all the scientific aids which recent research has placed at the disposal of the profession. Up to the present over 5,000 of these doubtful cases have been examined and reported upon by the hospital. The statistics are now being worked out, and will, no doubt, in the future form the subject matter of various interesting communications. Of 1,000 cases taken as a sample, it has been found that 447 were classified as fit for full military service, either at home or abroad, 291 as fit for garrison duty or labour purposes, and 262 as fit either only for clerical work or totally rejected. It must be remembered that the experts only act as advisers to the recruiting boards, with whom, of course, the final decision necessarily rests. In addition to the ordinary methods of clinical examination, which includes a careful consideration of the patient's subjective symptoms, the importance of which Sir James Mackenzie has recently emphasized, an electro-cardiograph is taken in the case of every recruit, and in most cases his heart is also examined by *x* rays. But perhaps the most interesting feature of the examination, in view of the present trend of medical thought, is the fact that every candidate is made to do a standard piece of work, his pulse-rate, blood pressure, and respiration being taken before, immediately after, and again three minutes after, the exertion. This test has been of the greatest service in estimating the efficiency of the heart muscle in many doubtful cases. It will be interesting in the future to compare the results reached at the National Hospital for Diseases of the Heart in the case of recruits with those obtained at the Mount Vernon Hospital, where soldiers already in the army are dealt with.

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## THE RAT AND ACUTE ANTERIOR POLIOMYELITIS.

AT a conference of state and territorial health officials held on August 17th and 18th at Washington, in conjunction with the United States Public Health Service, it was reported that the result of the national survey at the time of the meeting showed that in the thirty-eight states and territories represented there had been since January 1st, 1916, a total of 11,717 cases of poliomyelitis. A committee appointed by the meeting has made a number of recommendations based on the assumption that the virus is conveyed directly from one human being to another either by sufferers or carriers. It advised that it was urgently necessary to take measures to prevent contamination by human excreta, or other bodily discharges, to suppress the fly nuisance, to prohibit the use of drinking cups in common, and to institute a general education campaign for cleanliness and sanitation, with particular instructions to parents and children concerning personal hygiene, especially of the mouth and nose. Dr. Mark Richardson, formerly secretary of the Massachusetts State Board of Health, has now advanced a theory that the rat may be responsible for the spread of the disease, either directly by contamination of food, clothing, or furniture, or through its fleas.[1] He began by enumerating facts militating against the belief that the virus is transferred by direct or indirect human contact; he pointed out that the disease is most prevalent during the spring, summer, and autumn, and declined after the onset of winter, though the population then becomes more congested in houses and schools; that the maximum prevalence of the disease is in country districts; that the disease has not been known to spread in general hospitals for children, nor in schools or institutions, nor among laboratory workers; and that it is comparatively rare for more than one case to occur in large families of children even under the markedly congested conditions of tenement life. In 1910 Dr. Charles E. Simpson, State Inspector of Health, called attention to two outbreaks following on the destruction of a refuse dump in the one case and an old barn in the other, and to an instance in which in an infected district of a city in Massachusetts many rats were said to have been found dead. In another city honeycombed by a muddy river and its tributaries the parts in which cases of the disease occurred seemed to have a remarkable relation to the watercourses. The whole experience of Massachusetts, Dr. Richardson stated, seemed to indicate that the disease had been endemic along the rivers, most of which are polluted by sewage to a greater or less extent. He thinks that the greater prevalence of the disease during the last twenty-five years may be due to the greater ease with which rats may now be transported in ships or railways, and gives instances of the animals' habit of spontaneous migration. A period of latency in the development of an epidemic seemed to be indicated by the fact that in a number of instances a single case occurred in the early months of the year, March or April, whereas the epidemic did not begin until May or June, a circumstance hard to account for on the assumption that the d sease is communicated directly from child to child. The period between generations of rats being approximately three months, Dr. Richardson suggests either that a new generation of young rats may be necessary for the further propagation of the disease, or that the virus must undergo a cycle of development in the rat flea. He notes that Rosenau, who has been working on the subject in the United States since 1912, had conveyed infection to young rabbits, and suggests that possibly young rats, like young human beings and young rabbits, are more susceptible to the disease than adult rats. As bearing on this it may be noted that a survey of age groups of the cases of poliomyelitis reported since the outbreak of the epidemic, made by the Department of Health of the City of New York, shows that of a total of 7,496 cases 751, or 10 per cent., were among children under 1 year of age; 5,662, or 75.5 per cent., among children between 1 and 5 years; 812, or 10.8 per cent., among children from 6 to 10 years; and 142, or 1.9 per cent., among children between 11 and 15 years; only 129 cases, or 1.7 per cent., occurred among persons of more than 16 years of age. The largest number of victims was among children between 2 and 3, of whom there were 1,714. Dr. Richardson states that Rosenau has recently produced

[1] *Boston Medical and Surgical Journal*, September 21st, 1916.

paralytic phenomena in rats by inoculation of the virus of infantile paralysis. Extended experimental investigations will be necessary to determine the value which should be attached to his theory, but Dr. Richardson is, we think, correct in saying that it is not easy to make the theory that it is conveyed by human contact fit all the facts.

## THE ABDOMINAL OPERATION FOR CERVICAL CANCER.

THE report by Dr. Comyns Berkeley and Victor Bonney, published in the JOURNAL of September 30th, on the results of operation by the radical abdominal method in 100 cases of carcinoma of the cervix, will have been read with interest both by surgeons and family practitioners, for it is, we believe, the first from a British source based on the view that five years' immunity from recurrence is to be reckoned a true cure. In patients not operated upon the average duration of life from the first symptoms to death is one year and nine months; as in the experience of the writers patients suitable for operation presented themselves to the surgeon for the first time after having had symptoms on an average for six months, the life expectation of these women had they not been operated upon would have been on the average one year and three months. They state that they operated upon every case in which in their opinion there appeared to be any probability of removing the growth, including thirty-five patients in whom the regional glands were involved, and in some which other surgeons had pronounced inoperable. The mortality of the operation itself was 20 per cent., and thirty-two of the patients were known to have died of recurrent growth; while seven were lost sight of. Two patients died each one year after the removal of the uterus, and free from signs of recurrence, from other diseases. In one of these cases, gynaecologists must bear in mind, death was due to acute urinary sepsis after an operation for the closing of a vesical fistula, a complication by no means rare in the experience of many skilled specialists. Drs. Berkeley and Bonney publish the fact that thirty-nine cases remain well five or more years after the operation, while the lives of thirty-two in whom recurrence took place were, for the most part, prolonged, since seven survived hysterectomy for three years or over.

## ON THE CHOICE OF A MEDICAL CAREER.

LAST week's issue of the BRITISH MEDICAL JOURNAL contained, on page 494, a report of the interesting address with which Surgeon-General M. W. Russell, C.B., Deputy Director-General of the Army Medical Service, opened the winter session of the Middlesex Hospital Medical School. The address contained references to various matters of historical and other importance with which we are not now concerned; but one particular point was raised by the speaker to which we gladly call attention, a point of no little practical importance both to the medical student, as larva of the medical man, and to the newly qualified practitioner, who must be regarded as the imago or perfect product of the developmental cycle that has led up to his qualification. Surgeon-General Russell emphasizes the fact that comparatively few men from his old hospital had entered the regular medical services of the army, the navy, and of India in recent years before the war. No doubt the same is true of the medical schools of other hospitals as well. Who is to blame? Surgeon-General Russell is inclined to blame the schools, which, as he shrewdly suggests, should contain "an organization for guiding the students into the professional avenues in which their particular talents will find the fullest play. In my day," he continues, "there was none, and I am unaware that the gap has been filled. Each of us has had to make the decision for himself, with no information other than that he could acquire by his own personal efforts and at a time of life when decision could in many cases only be fortuitous. Many drifted until at last they could find something to cling to, perhaps only to find years later that a mistake had been made. What a waste of talent and skill this means! Is it too much to ask that there should be some official connected with the school whose business it should be to study the men, learn their qualifications and potentialities, give them the information they require to aid them in choosing their career?" The suggestion here made is excellent from every point of view. The duty of studying the temperaments and capacities of the individual medical students is one that comes by nature to some deans of medical schools, and is, indeed, forced by circumstances upon them all. The business of knowing what openings the varieties of medical practice—using the term in its widest sense—present, has to be learnt and kept up to date. The history of the medical services both of the royal navy and of the army affords instances of periods during which it has been proper for the dean of a medical school not to advise young men to enter either. It has even been his duty to advise to the contrary, and there can be no doubt that the attitude then taken up by the medical schools lent a great deal of force to the demands, based on general considerations of policy and justice, for the reforms which have been carried out from time to time. At the present time we know that a great deal of dissatisfaction is felt with regard to the terms and conditions of service in the Indian Medical Service, and this is a matter which deserves the attention of deans of medical schools. Some there are who already interest themselves keenly and effectively in the problem of the choice of a career that in normal times fronts so many newly qualified men. Would it not be possible to have this highly decanal function more clearly defined and its great importance more fully recognized?

## "THE BRITISH JOURNAL OF OPHTHALMOLOGY."

THE British school of ophthalmology has from the earliest days of the scientific study of the functions and disorders of the eye taken a very high place in international medicine, and its contributions to the literature of the subject have been many and important. Hitherto they have, perhaps, somewhat suffered in the effect they produced owing to diffusion. The files of the *Royal London Ophthalmic Hospital's Reports*, founded in 1857, are a storehouse of observations of the highest importance; the *Ophthalmic Review* has been conducted since its establishment in 1881 with great ability, and its younger contemporary the *Ophthalmoscope*, which first appeared in 1903, has won a distinguished place for itself. The position was, however, not regarded as altogether satisfactory, and some time ago the Council of the Ophthalmological Society started a movement for amalgamation. In consequence a meeting of the leading British ophthalmologists was held in July to discuss the matter. Those present, numbering twenty-eight, constituted themselves a committee and appointed a subcommittee with the president of the Ophthalmological Society, Mr. Walter H. Jessop, as chairman, Mr. Priestley Smith, Mr. Paton, and the editors of the three periodicals, as members, and Mr. Brewerton as secretary. This committee prepared a scheme of amalgamation, and for financing the new periodical. It was submitted to a largely attended general meeting of British ophthalmologists held at the Royal Society of Medicine on September 29th. After a statement by the chairman, Sir Anderson Critchett proposed, and Mr. Priestley Smith seconded, a resolution providing that a British journal of ophthalmology incorporating the three periodicals mentioned should be founded. This was carried with enthusiasm and without discussion. The first number of the new periodical—which will be edited by Mr. Sydney Stephenson, hitherto editor of *The Ophthalmoscope*—will appear in January next, and subsequent numbers will be issued at the beginning of every

month; each will consist of at least 64 pages, and the annual subscription will be £1 11s. 6d. We congratulate British ophthalmologists on having taken this step, for there can be no doubt that the multiplication of periodicals devoted to the same subject is not on the whole to be desired. We know the advantages claimed for competition and rivalry, but when a department of science and practice has reached the stage attained by ophthalmology the need for such stimulus has been removed. It is a source of weakness to have the national work divided among several publications; it adds to the labour of specialists and perplexes general physicians and practitioners who, recognizing the importance of ophthalmology in general medicine, desire to make sure that they do not miss the record of any important advances.

## THE LYONS SCHOOLS FOR SOLDIERS.

Lyons, among French cities, was one of the earliest to recognize the need for special institutions to care for men disabled in the war. Guided by its mayor, M. Herriot, and with the help of the eloquent pen of M. Maurice Barrès, it quickly gave practical effect to the national desire for the establishment of schools in which disabled men might be trained. The city had the advantage of the experience of certain organizations established at various times during the last century in France, but when it opened its first school for men who had undergone amputations, on November 30th, 1914, it had almost everything to learn. It began in a small way, but over a year ago this particular school had more than two hundred pupils, and other schools and institutions for disabled men had been established by the city. The military centre for jaw cases, an account of which is given elsewhere in this issue, would seem to have been the earliest of all, for it began work as an independent institution in October, 1914. It has since been greatly extended, and the number of beds set aside for this purpose is some indication of the magnitude of the work which is being done for disabled men by the city of Lyons.

## LETTSOM AND THE MEDICAL SOCIETY OF LONDON.

At the conclusion of the annual general meeting of the Medical Society of London, on Monday last, the retiring president, Dr. William Pasteur, made reference to the plaque which has been removed from the society's old house in Bolt Court to the Library in Chandos Street. The sale of the Bolt Court property, he said, marked the close of a period in the history of the society. It was founded by Dr. John Coakley Lettsom in 1773; down to 1776 its meetings were held at Dr. Lettsom's house in the city, and for the next two years at a house in Crane Court, Fleet Street. In 1778 Dr. Lettsom purchased and presented to the society the freehold house, 3, Bolt Court, Fleet Street, where it continued to meet until 1852. When the property was sold recently the Charity Commissioners granted permission to remove the plaque which stood over the entrance door. The plaque, which is of terra cotta, is in a state of excellent preservation, thanks to the many coats of paint it has received. It has been cleaned and restored. The background is occupied by the great pyramid of Egypt, flanked by palm leaves. The principal figure is the Isis of Sais, the revealer of the mysteries of nature and universal benefactress, who presided at the birth of children and rocked the cradle of the Nile. She is also reputed to have created the science of medicine and to have discovered the healing properties of plants. On either side crouches a sphinx, the emblem of mystery, whilst at her feet, encircled by the snake, the emblem of eternity, is a Greek inscription, which may be translated: "I am that which is, has been, and shall be: my veil no one has lifted."

# Medical Notes in Parliament.

**Disabled Soldiers.**—Among the first questions asked in the House of Commons when it reassembled on October 10th after the adjournment were put to the Local Government Board by Mr. Hogge, who asked for information as to the result of the conference between the Statutory War Pensions Committee and municipal authorities, and what steps the Statutory Committee proposed to take to deal with the care, training, and employment of disabled soldiers and sailors. Mr. Hayes Fisher replied as follows:

Two conferences have taken place, and at the second many details were discussed in a very friendly manner. The Statutory Committee are satisfied that they will now be able to make satisfactory arrangements with regard to local funds. The Lord Mayor's Committee had unanimously resolved that no grant made out of any fund raised locally, or by way of voluntary gift, should be taken into account by the local or Statutory Committee, or treated as "other income" as defined by the regulations, provided the same does not form a permanent addition to the income of the recipient. This has been accepted by the Statutory Committee, and words to the above effect have been inserted in the instructions accompanying their regulations.

The methods which the Statutory Committee propose to adopt in dealing with the case of disabled men, including provision for their health, training, and employment, were set out in the circular which was issued to the local committees on July 27th last. Individual cases must necessarily be dealt with locally, and I am glad to say that all the schemes for constituting the local committees in England and Wales and Scotland have now been approved. Meanwhile the Statutory Committee have agreed with the Insurance Commissioners upon a scheme for the medical treatment (including specialist advice) of all disabled sailors and soldiers, whether previously insured or not. With regard to training, in addition to the special schemes, such as those in operation at Roehampton, Brighton, and St. Dunstan's, the Statutory Committee propose to utilize so far as possible the training which is afforded by the local education authorities, and information as to the facilities which can be offered for such training has been obtained from the great majority of technical institutions throughout the country and communicated to the local committees. Further, the assistance of the chambers of commerce has been sought by means of a circular sent to them through their association. The Statutory Committee are approaching the Treasury with the view of obtaining sanction for payment of an adequate maintenance grant for the man during his period of training in addition to the allowance for his wife and family. With reference to employment, the Statutory Committee have made special arrangements with the Board of Trade as to the use of the labour exchanges, and of the department's professional classes register for officers. I may add, however, that the demand for labour is so great, and work is so plentiful, that there has been little difficulty in employment being obtained.

In reply to a supplementary question by Mr. Wardle, Mr. Hayes Fisher said that the scheme sanctioned by the Insurance Commissioners had yet to receive the assent of the Treasury; it covered, as he understood, the whole of the country. In reply to Sir Edward Carson, who asked whether the House would be afforded an opportunity of considering the scheme, Mr. Hayes Fisher said that he thought a bill must shortly be introduced to place the Statutory Committee in possession of the five millions of money the Chancellor of the Exchequer had promised to it, and that then a very adequate debate could take place on the whole question of pensions. In reply to Mr. Brookes, Mr. Bonar Law said that the question of the establishment of one pensions authority for the United Kingdom had received attention, and that it was hoped that a statement would be made shortly as to the intention of the Government.

*London Examining Medical Officers.*—Captain Bennett-Goldney asked whether examining medical officers in the London area, though occupied for the whole of their time, received only 24s. a day, whereas officers in other commands doing exactly similar work in many cases received 40s. a day for only a portion of the day; and whether, as these examining officers in London, being liable to twenty-four hours' notice, were in no sense more permanently appointed than those elsewhere he would expedite the settlement of the question. Mr. Forster said the difference between the two cases had not been quite correctly stated in the question; a 24s. rate was appropriate to employment which was more or less continuous and permanent. The maximum of 40s. was payable for occasional service only.

# THE WAR.

## MILITARY CENTRE FOR JAW CASES AT LYONS.

*(From an Occasional Correspondent.)*

On September 15th, 1914, a hospital section of thirty beds was opened in Lyons for the reception of soldiers with wounds of the face. It was at once found that the accommodation provided was inadequate, and the army medical authorities having come to an understanding with the Lyons Hospital administration, a section to contain one hundred beds was established at the St. Pothin Hospital under the direction of Dr. Pont, and started work on October 1st, 1914. On December 1st, 1914, another hospital with 250 beds was opened on the Quai Jayr, and received generous support from the public. Subsequently auxiliary hospitals were established at Villeurbanne, Fontaine-sur-Saône, and Neuville-sur-Saône to receive men on the road to recovery and requiring special attention not oftener than once a week. The number of beds at the St. Pothin Hospital was raised to 140, and two new auxiliary hospitals were created, one containing 200 beds. In addition beds were reserved at the Desgenettes Hospital and the Hôtel-Dieu, for Mohammedans at No. 21 Auxiliary Hospital, and for German wounded at Villemanzy.

Altogether beds for 800 jaw cases are provided in Lyons or in immediate communication with the centre there, and the whole organization is under the general direction of Professor Delore, at the École du Service de Santé Militaire, where there are now 200 beds. The Lyons Maxillo-facial Centre now comprises three principal departments—(1) stomatology, (2) odontology, and (3) edentulous service. Dr. Pont is the senior member of the staff, which consists of seven mobilized medical men, mobilized surgeon-dentists, non-mobilized professors of the dental schools, and mobilized dental mechanical assistants.

The Jayr centre, which may be taken as typical of the others, is established in a newly built school. It has an operating theatre with a sterilizer for dressings and instruments, and a dressing-room provided with a manometer for the regulation of the pressure of douches. The kitchens are specially fitted, and are well supplied with mincing machines. The worst cases are kept on milk diet, to which soups, purées, meat juice, and egg-flip are added. Every patient is radiographed before treatment to determine the situation of the fracture or presence of foreign bodies, and all seriously mutilated cases are photographed on arrival and during the course of treatment. In addition, casts of the most typical fractures are made.

### "*Service de Stomatologie.*"

It appears from a study of Dr. Pont's monthly report that the wounded, who have always previously received an injection of antitetanic serum, are on admission first subjected to careful cleansing of the wounds with a solution of potassium permanganate 1 in 2,000 under pressure, repeated every two hours. The wounds are painted with tincture of iodine (1 in 10) 1 part and tincture of benzoin 8 parts.* Sloughing wounds are touched with hydrochloric acid 1 in 5. Foreign bodies and teeth, or splinters of bone the vitality of which is considered to have been destroyed, are removed, but fragments which it is thought may survive are left in position. Loose teeth are usually allowed to remain for some days, in order not to disturb fragments which are in good position. All operations are done under general anaesthesia; for this purpose ethyl chloride is preferred, as ether and chloroform are more apt to lead to pneumonia by inhalation. Meanwhile, the gums are massaged in order to hasten consolidation of the fragments. Mutilated soft parts are held in place by means of dressings. Dr. Pont recognizes three stages in the treatment of fractures of the jaw—reduction of the fragments, fixation of the jawbones, and restorative prosthesis. To these Dr. Frey would add a fourth stage—that is to say, the re-establishment of the motor function of the mandible. The one great object in view is restoration of a good occlusion.

* The strength of the tincture in the French *Codex* is 1 in 5, or twice the strength of the simple tincture of benzoin of the *British Pharmaceutical Codex*.

### *Recent Fractures.*

In simple fractures of the ascending ramus without displacement nothing more is considered necessary than some form of "four-tailed" bandage. When there is displacement, plating, wiring, and extensive operations are not held justifiable. When there are several fractures of the horizontal ramus the open-mouth position of Cl. Martin is recommended. Some cases of deformity after double fracture have been improved by slow pressure under an anesthetic. In fracture of the horizontal ramus with loss of substance the apparatus employed has in view restoration of occlusion; bony union appears to be a secondary consideration. No new form of apparatus is here described. As fixation splints, some form of inter-dental splint is most often used—chiefly a simple metal form.

### *Restorative Prosthesis.*

When there is but little loss of bone, "bridges" are used. Where a large part is lost, especially from the chin region, the soft parts of the floor of the mouth must first be stretched. This is effected by using balls of tin, which are kept in place by wires hanging out of the mouth. More tin is added as needed. Eventually the space is filled in by a heavy prosthetic apparatus. A metal gutter fixed to the teeth of each fragment supports this weight. Over this a vulcanite denture is placed.

When opening the mouth is impossible owing to fixation of the joint, slow stretching is effected by use of springs like those used in rat traps, or of laundresses' linen clips. Le Dentu's operation of detaching the masseters and pterygoids from round the angle of the jaw gives good results, but must be followed by the use of separation springs.

### *Restoration of the Face by Surgery and Prosthesis.*

Certain victims of maxillary wounds present cutaneous lesions of the cheek, nose, lips, or ears. The commonest lesion of this kind involves the lips. Cheiloplasty covers the dental arches and ensures buccal occlusion, and so enables the subject to close the mouth and to retain food introduced therein.

It is unnecessary to describe the various methods employed according to circumstances, as they will be found in any textbook of surgery. I will only refer to certain special cases of maxillo-facial restoration. Wounds leaving a scar with considerable depression have been dealt with by means of adipose grafts, which have yielded durable results. Here is one of Dr. Pont's cases:

E., wounded on September 9th, 1915, at Harazée by a bullet that passed through the face, coming out on the left side at the junction of the upper lip and cheek. The left upper jaw was fractured, with loss of part of the alveolar process and falling in of the antero-external wall of the antrum. The left upper lip was divided, and during cicatrization a cutaneous bud formed in the neighbourhood of the commissure. As soon as suppuration had quite subsided I decided to graft a bit of fat in this depression in order to restore the original shape of the cheek. After separating the adhesions of the cheek to the jaw, on December 6th, I took a bit of fat from the buttock and intercalated it in the thickness of the muscle layer of the cheek. I sutured it carefully in two layers and applied a dry dressing.

The results were excellent; no suppuration or other local reaction.

The little cutaneous ridge was removed at the same sitting, and the margins of the wound united by a stitch, so as to reform the red edge of the lip.

The mouth is prepared for bone grafting as follows:

The jaws are placed in good occlusion, an arch is placed on the upper jaw, on the lower jaw four rings are placed, fixed to the molars and premolars. These rings are joined together by very strong piano wires, the intervals between them being bridged with metal wires soldered on. Each arch is provided with tiny hooks intended to receive the ligature wires to be applied the day after the operation. The lower jaw is thus fixed to the upper (blockage). The lower apparatus is sealed on. The surgeon makes an incision along the lower border of the jaw. He freshens the bony fragments and clears all fibrous tissue from the interval between the fragments. The end of each of these is cut V shape for the reception of the graft. The latter is usually taken from the seventh rib, sometimes from the tibia. It must be rather longer than the cavity to be filled so that it exerts some force on the two fragments. It is introduced by the aid of a mallet and the soft parts are sutured. The day following the operation blockage of the

jaws is carried out and the patient is left thus for about forty-five days.

Rhinoplasty has also been performed by various methods. In some instances recourse was had to French and Indian methods, but in war time rhinoplasty necessitates too prolonged a sojourn in hospital. To obviate this drawback and to restore to the wounded man deprived of part or the whole of the nose or ear a normal appearance Dr. Pont makes a cast of the face. On the positive cast thus obtained the absent nose is modelled in wax, care being taken to scoop out the wax opposite the scars. The waxen nose thus obtained is taken off and dipped in plaster and a cast in two or three parts as desired is obtained. The formula for the paste devised by Drs. Pont and Duplant is:

| | |
|---|---|
| Pure white gelatine | 20 parts |
| Coignet glue | 5 ,, |
| Glycerine | 62 ,, |
| Distilled water | 25 ,, |

A colour resembling that of the skin is obtained by yellow ochre and vermilion water colours. The seams of the plaster are scraped away and the artificial nose is fitted by painting the posterior part with the following adhesive:

| | |
|---|---|
| Mastic "en larmes" | 15 parts |
| Canada balsam | 2 50 ,, |
| Sulphuric ether | 15 ,, |

It is then quickly applied to the skin and the margins smoothed down with a slightly warmed instrument. Should the nose get damaged the patient can recast the paste in his mould and apply it for himself.

*Odontological Department.*

The odontological department is situated in the dental school, No. 20, Quai de la Guillotière. The operative dental ward comprises fifteen dental chairs, with the tables and instruments required by each operator. The ward for examining patients has three chairs, the operating theatre two. Soldiers, non-commissioned officers, and officers undergoing treatment at some other Lyons hospital, and requiring dental attention, are treated in the operating room. Extractions are made under local anaesthesia, and teeth are stopped with cement or amalgam. Vulcanite apparatus are also made.

The number of officers, non-commissioned officers, and soldiers under treatment in the hospitals between January 24th and February 24th, 1915, was 480, and 585 extractions, 170 stoppings, 600 urgent dressings, and 14 scalings were performed. The wounded in hospitals belonging to the Société des Secours aux Blessés Militaires are visited by a surgeon dentist, and if able to be moved are sent to the school, where they obtain the treatment required.

*The Edentulous Wards.*

The ministerial circular of July 31st, 1915, created the department of "Assistance to the Edentulous." Many soldiers, especially those coming from the front, have difficulty in taking food owing to the state of their teeth. They were placed under treatment at the various centres created with this purpose. The biggest is at Lyons. The apparatus for dental prosthesis are manufactured at the dental school. Between August 17th and September 25th, 1915, the number of dentures made was 67, with 402 teeth, and 197 hooks were manufactured.

At a recent meeting of specialists, Dr. Villain, of Paris, calculated that throughout France at least a thousand men a month would thus be rendered fit for service.

Dr. Pont has issued a "first-aid outfit" to enable surgeons at the front to immobilize fractures of the jaws on the arrival of the wounded at the *poste de secours*. This comprises arches, rings, nuts, and a few indispensable instruments for their fixation. Wounded men have already been received at Lyons from the front with their fractures immobilized by arches.

The number of deaths among close upon 2,000 wounded attended to during the year 1915 was three. The men treated and cured enabling them to return to the fighting line constituted 75 per cent. of the hospital subjects; others were discharged from the army for grave wounds comparable to the loss of a limb, and others were sent into the auxiliary services.

## CASUALTIES IN THE MEDICAL SERVICES.

### ROYAL NAVY.

*Died on Service.*

SURGEON W. H. EDMUNDS, R.N.

Surgeon William Henry Edmunds, R.N., died at the Western Infirmary, Glasgow, on October 4th. He took the diploma of L.M.S.S.A. in 1913, and joined the navy as a temporary surgeon on December 15th, 1915.

### ARMY.

*Killed in Action.*

CAPTAIN G. P. SELBY, R.A.M.C.

Captain Gerard Prideaux Selby, R.A.M.C., was killed while attending the wounded on September 26th, aged 25. He was born in 1891, the eldest son of Dr. Prideaux George Selby, of Teynham, Kent, and was educated at the Grange, Folkestone, at Winchester, at New College, Oxford, and at St. Bartholomew's Hospital, rowing in his college boat in 1910. He served in a British Red Cross unit in Bulgaria in the Balkan war of 1912. In 1914 he graduated B.A., M.B., and B.Ch. at Oxford, taking also the diplomas of M.R.C.S. and L.R.C.P.Lond. in the same year. After serving as house-surgeon at Bart's, he entered the R.A.M.C. as a lieutenant on July 31st, 1914, and, like all the other lieutenants in the R.A.M.C., was promoted to captain on March 30th, 1915. He went to France with the Argyll and Sutherland Highlanders in December, 1914, was wounded at Ypres in March, 1915, and returned to the front on September 4th last.

CAPTAIN S. CLARK, R.A.M.C.

Captain Sidney Clark, R.A.M.C., was killed in action on October 2nd. He was educated at King's College, London, where he was Warneford scholar, and took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1896. He was house-surgeon and house-physician at King's College Hospital, anaesthetist at Leeds General Infirmary, and honorary physician to the Leeds South Dispensary. Afterwards he went to the United States, where he took the M.D. of Nevada University in 1905, and was President of the Nye County Medical Society. Returning to England, he was in practice in Fulham Road, London, before the war; he joined the 5th London Field Ambulance as captain on September 25th, 1914.

CAPTAIN W. F. MACALEVEY, R.A.M.C.

Captain William Francis MacAlevey, R.A.M.C., was killed in action on September 26th, aged 26. He was the eldest son of Dr. W. C. MacAlevey, of Leicester, and was educated at Stoneygate Preparatory School, Leicester, at St. Mary's College, Chesterfield, where he was captain of the school, and at St. Mary's Hospital, where he gained a science scholarship. At St. Mary's he was captain of the Association football team, and a member of the Rugby fifteen; he also played frequently for the United Hospitals. He took the diplomas of M.R.C.S. and L.R.C.P.Lond. in January, 1915, and had also passed the second examination for the M.B.Lond., intending to take the degree after the war. He took a temporary commission as lieutenant in the R.A.M.C. in February, 1915, went to the front with a field ambulance in July, 1915, and was promoted to captain after a year's service.

Captain F. S. Walcott, R.A.M.C. (temporary).
Captain E. R. Welch, R.A.M.C. (temporary).

*Died of Wounds.*

CAPTAIN O. G. PARRY-JONES, R.A.M.C.

Captain Owen Guy Parry-Jones, R.A.M.C., who is reported as having died of wounds, was the elder son of Dr. M. Parry-Jones, of Derby. He was educated at Sherborne School, at Oxford, and at Guy's Hospital. He played in the Rugby fifteen both at school and at Guy's. He graduated B.A. at Oxford in 1910, and took the diplomas of M.R.C.S. and L.R.C.P.Lond. in 1915. He joined the Special Reserve of the R.A.M.C. as a lieutenant on February 8th, 1915, and became captain six months later. He was attached to the Suffolk Regiment.

*Died on Service.*

COLONEL B. B. GRAYFOOT, C.B., I.M.S.

Colonel Blenman Buhót Grayfoot, Bombay Medical Service, died in Egypt on September 30th, aged 56. He

was educated at Edinburgh University, and took the Scottish triple qualification in 1885, the M.R.C.S. in 1886, and the M.D. of Durham in 1903. Entering the I.M.S. as surgeon on September 30th, 1886, he became major on September 30th, 1898, lieutenant-colonel on September 30th, 1906, reached the selected list on August 12th, 1909, and was promoted to colonel on August 25th, 1912. Most of his service was spent in civil employment in Bombay, where he was for several years secretary to the surgeon-general, and afterwards civil surgeon of Karachi. On his promotion he was posted as A.D.M.S. to the Derajat and Bannu Brigades, and went to France in September, 1914, as principal medical officer of one of the divisions of the Indian Expeditionary Force. With these troops he went from France to Egypt and to Mesopotamia, whence he was recently invalided. He received the C.B. for his services on January 14th, 1916.

### Captain D. T. C. Frew, R.A.M.C.

Captain David Thomas Crichton Frew, R.A.M.C., died at Aldershot after an operation for appendicitis on September 29th. He was educated at Glasgow High School and at Glasgow University, where he graduated M.B. and Ch.B., with honours, in 1911. Subsequently he filled the posts of extra dispensary physician and clinical assistant at the Royal Infirmary, resident medical and surgical assistant at the Western Infirmary, house-surgeon to the outdoor department of the Maternity and Women's Hospital, and lecturer on anatomy in the Western Medical School; he went into practice at Burnbank Terrace, Glasgow. In May, 1915, he took a temporary commission as lieutenant in the R.A.M.C., was wounded in October, but returned to duty shortly after, and was promoted to captain after a year's service. On May 22nd, 1916, he married Marie Louise, daughter of the late Dr. Fernand Lucien Perregaut, Paris, who is thus left a widow a few months after her marriage.

*Wounded.*

Captain L. Adamson, R.A.M.C. (temporary).
Captain W. B. Allen, R.A.M.C.(T.F.).
Captain N. J. Barton, Canadian A.M.C.
Captain H. W. Bayly, R.A.M.C.(T.F.).
Captain G. D'R. Carr, R.A.M.C. (temporary).
Captain H. Mathewson, R.A.M.C. (temporary).
Captain B. N. Murphy, R.A.M.C. (temporary).
Captain G. H. B. Sebastian, R.A.M.C. (temporary).
Captain P. R. Woodhouse, R.A.M.C. (temporary).
Lieutenant W. A. Cochrane, R.A.M.C. (temporary).
Lieutenant T. M. Crawford, R.A.M.C. (temporary).
Lieutenant J. N. Cruikshank, R.A.M.C. (temporary).
Lieutenant J. Oag, R.A.M.C. (temporary).

### Deaths among Sons of Medical Men.

Cameron, J. H., Lieutenant Black Watch, son of Dr. Cameron, of Dollar, reported as missing at Loos on September 25th, 1915, now assumed killed. He was educated at Dollar Institution, where he was colour-sergeant of the Cadet Corps, got his commission in October, 1914, and was promoted to lieutenant on December 3rd, 1914.

Cunningham, Charles Clephane, Second Lieutenant Royal Engineers (T.F.), youngest son of the late J. D. Cunningham, M.B., killed on September 9th. His commission was dated March 19th, 1915.

Fenner, C. F. N., Second Lieutenant Scots Guards, son of Dr. Robert Fenner, 1, Spanish Place, Manchester Square, London, W., was killed recently. He was born at Cromer in 1888, educated at Felsted School, and was on an estancia at Lautaro, Chile, before the war. He got his commission on August 15th, 1915, was invalided home last summer, but after a short rest returned to the front last August.

Hinings, Frederick W. C., Captain East Yorkshire Regiment, son of Dr. J. W. Hinings, of Leeds, killed recently, aged 28. He was educated at Leeds Grammar School, and at Blundell's School, Tiverton, was captain of Headingley Rugby Football Club, and frequently played for Yorkshire, till he went to a rubber plantation in the Malay Peninsula, from which he returned when the war broke out, and joined the East Yorkshire Regiment, becoming lieutenant on February 2nd, 1915. Soon after reaching the front he was wounded, but returned to duty two months ago.

Kidd, Guy Egerton, Major Royal Field Artillery, eldest son of Percy Kidd, M.D., of 60, Brook Street, London, W., killed September 26th. He was educated at Clifton and at the Royal Military Academy, Woolwich, got his first commission in 1901, and became major last February. He went to the front in March, 1915, and got command of his battery last October.

McDonnell, Charles Edward, Lieutenant Middlesex Regiment, elder son of Fleet Surgeon J. R. McDonnell, R.N., of 3, Gloucester Road, London, N.W., killed September 26th, aged 21.

Rennie, Cyril T., Second Lieutenant Leicestershire Regiment, son of Dr. George Rennie, J.P., of Sydney, New South Wales, killed September 25th, aged 22. He came to England with his brother to join the army last November, and had been at the front since June.

Saunders, George James Rich, Lieutenant South Lancashire Regiment, attached Leicestershire Regiment, son of Dr. E. A. Saunders, of Pembroke Dock, South Wales, killed September 26th, aged 20. He was educated at Epsom College, but left at the beginning of the war, and joined the Leicestershire Regiment, becoming lieutenant in January, 1916. He was afterwards transferred to the South Lancashires, and went to the front in July, 1915.

Scott, Sidney Maurice, Second Lieutenant Coldstream Guards, younger and only surviving son of Mr. J. Harrison Scott, F.R.C.S.I., of Dublin, reported "missing, believed killed," now presumed killed on September 15th, aged 19. He was educated at Winton House School and at Eton, where he was captain of his house, got his commission on September 15th, 1915, and left England last May.

Townsend, Francis E. Stevenson, Lieutenant Durham Territorials, the eldest son of Dr. F. E. Townsend of Normanby, died of wounds received in action on September 18th, aged 23. A few weeks after war broke out he joined the local Territorial unit of the Durham Light Infantry, with which he went to France in April, 1915. At the time of enlistment he was serving his articles as solicitor with his uncle, the Town Clerk of Darlington, and in six months would have taken his final examination. Lieutenant Townsend was popular with all ranks, and was an officer of much promise. The commanding officer, in a letter to his parents, wrote, "Your son had a very severe time before he was struck, owing to seven officers being hit, but we got our final objective and more. This was owing a great deal to your son's work in the early part of the battle."

## NOTES.

### A Posthumous Victoria Cross.

The King received Mrs. Green on October 7th, and handed to her the Victoria Cross won by her late husband, Captain John Leslie Green, R.A.M.C., under the following circumstances:

For most conspicuous devotion to duty. Although himself wounded, he went to the assistance of an officer who had been wounded and was hung up on the enemy's wire entanglements, and succeeded in dragging him to a shell hole, where he dressed his wounds, notwithstanding that bombs and rifle grenades were thrown at him the whole time. Captain Green then endeavoured to bring the wounded officer into safe cover, and had nearly succeeded in doing so when he was himself killed.

Captain Green, who was killed in France on July 1st, was 27 years of age. He was educated at Felsted, and went up to Downing College, Cambridge. He took honours in Part 1 of the Natural Science Tripos and stroked his college boat for the three years he was up. He afterwards studied at St. Bartholomew's and took the diplomas of the Conjoint Board in 1913. At the outbreak of the war he first had a commission in the 5th South Staffordshire Regiment, was afterwards transferred to a field ambulance, and was eventually medical officer to the 5th Sherwood Foresters. He was the son of Mr. J. G. Green of Houghton, Huntingdon, and had married only last January Edith Mary Nebitt Moss, M.B., B.S., daughter of the late Mr. Francis J. Moss, of Stainfield Hall, Lincolnshire.

### Gratuities to Neurasthenic Soldiers.

A Royal Warrant, issued in Army Orders, makes special provision for soldiers discharged on account of neurasthenia, functional nerve disease, or functional paralysis. By this it is provided that a soldier discharged on account of one of these complaints may be granted a final gratuity in lieu of pension, if the Army Council is satisfied that such a course would be more beneficial to him. The gratuity shall not ordinarily exceed £50, but in special circumstances a sum not exceeding £100 may be given. These provisions extend to soldiers discharged before the date of this warrant who have been specially recommended for a gratuity.

# England and Wales.

### The Refreshment House Experiment in Carlisle.

At a meeting last week of the Carlisle Local Committee in connexion with the Central Board's scheme of State control of the liquor traffic, some further indication of the lines which the Board's policy would follow was afforded. The "off" sale of spirits in bottle, formerly carried on at 106 places, is to be limited to 17. Grocers' off licences are to be abolished by the end of this month. Plans for the reconstruction of several public-houses have been approved, and in carrying them out "snugs" will be abolished, and large refreshment rooms, with reading and writing rooms, provided. Several licences will probably be extinguished, and a number of licensed houses in Longtown, and between it and Carlisle, purchased by the Board before the Carlisle scheme was launched, will now be placed under the direction of the Carlisle Committee.

There was a slight increase in convictions for drunkenness during September, but the general conditions in this respect are better than they were, and it is maintained locally that the reason for the large number of convictions earlier in the year was that the Government suddenly introduced some 14,000 labourers into the district, many of them not at all of a sober class, who resorted to the city for a week-end debauch. Men of this class are steadily leaving the district, and this may account for much of the improvement. The need for strict regulation is, however, plain when it is learnt that it is the intention to increase the number of women and girl workers in Carlisle and Longtown and between it and Dumfries from 2,000 to 4,000. Big hostels for them are to be erected, but meanwhile special trains are being run daily from Carlisle. It appears that the women work in three shifts of nine hours, each overlapping in the twenty-four hours.

### Welsh Hospital for Maimed Soldiers.

The scheme for establishing at Cardiff a hospital for maimed soldiers on the same lines as the Queen Mary Convalescent Hospital at Roehampton, and the hospitals in Scotland, has now been placed upon a firm basis, and the house pronounced suitable for the purpose—the old mansion house in Cardiff—has been purchased. A few donors in Cardiff have given amounts totalling £20,000, which will be sufficient not only to purchase the house but to equip it. Mr. J. P. Cadogan and Mr. Percy Miles each gave £5,000, Messrs. Morgan, Wakley, and Co. £2,500, and an anonymous friend has handed the remaining £7,500 to Lieutenant-Colonel Lynn Thomas, who, with the Lord Mayor of Cardiff (Dr. Smith) have been active in promoting the scheme. In addition to the old mansion house, two adjacent houses and outbuildings, which will probably be utilized as workshops, have been most generously given by the James Howell family. A deputation consisting of the Lord Mayor, Lieutenant-Colonel Lynn Thomas, Mr. Percy Miles, Lieutenant-Colonel Robert Jones, and Mr. Herbert Cory, M.P., had interviews with the heads of the medical departments of the Admiralty and War Office last week, when the scheme, which is to provide fifty beds, received official sanction.

### Bradford War Hospital.

The Princess Marie Louise opened the extension of the war hospital at Bradford last week. The Lord Mayor said that when an urgent request was received from the War Office for more hospital accommodation a committee was set up and the large sum of money requisite was raised in three or four weeks. At first it had been proposed to erect a temporary building, but it was eventually thought the buildings should be permanent, so that they might be of use to the citizens of Bradford in the future. The Princess, in declaring the extension hospital open, spoke of the cheerfulness with which the wounded met their ill fortune, and paid a tribute to the work of the nurses and medical staff. The way in which the womanhood and girlhood of England had come forward to do the work and had stuck to it for two years was admirable. The Princess also visited the war hospital supply dépôt, where volunteer lady workers make dressings and other requisites for the hospitals, and the Guardians' Colony, where are accommodated many of those who have been displaced by the extension of the war hospital.

## Ireland.

The Carrick-on-Shannon, No. 2, Rural District Council has received a further letter from the Local Government Board dealing with the outbreak of fever and the necessity for providing a proper water supply, but at its meeting last week resolved to take no action.

The Portadown Town Council has decided to include cerebro-spinal meningitis and poliomyelitis in the list of notifiable diseases. Dr. M. B. Costello, Dunmore, has reported to the Glenamaddy Guardians that several cases of poliomyelitis had occurred in a neighbouring district. The guardians are taking steps to make the disease compulsorily notifiable.

### Local Government Board and Medical Appointments during the War.

The Local Government Board (Ireland) has addressed the following letter to the boards of guardians throughout Ireland:

Sir,

I am directed by the Local Government Board for Ireland to advert to their circular letter of November 26th last intimating that vacancies occurring after that date in the Poor Law medical service should not be filled permanently until the termination of the war, and that in the interval the best dispensary arrangements for the discharge of the duties of such offices should be made, and I am to state that the doctors appointed by the guardians to act temporarily in these posts are usually newly qualified practitioners who are themselves eligible for medical appointments in the army. Similar conditions obtain in the case of substitutes for the medical officers who, actuated by a higher sense of duty and patriotism, have temporarily relinquished their appointments and volunteered for service in the Royal Army Medical Corps. The demand of the military authorities for more medical men to join the army is most urgent, as they require all the available young men to provide for the care and treatment of the wounded, and the guardians should bear this supreme consideration in mind and avoid giving any inducement to medical men of military age to seek civil appointments when other suitable and satisfactory arrangements can be made. The Board are of opinion that whenever a medical officership becomes vacant, either permanently or temporarily, the guardians should, if possible, assign the post to a doctor holding a permanent local appointment, or the duty should be divided between two or more such medical officers. Only as a last expedient should a separate medical officer be temporarily appointed, and then the selection should, as far as possible, be limited to doctors who are over 45 years of age or otherwise ineligible for military service. The guardians should invite the co-operation of their medical officers in this matter and request their views as to the best means for filling the temporary vacancies for the period of the war. The guardians should also issue instructions that any medical officer who intends volunteering for military service should first apply for leave of absence, so that suitable arrangements could be made for the discharge of his duties in accordance with the regulations and the foregoing suggestions.

The Athlone guardians have already acted on this advice, and have filled the vacancy at Brideswell, Athlone, by appointing temporarily Dr. Sheridan, Kiltoom, to the additional dispensary at a salary of £4 4s. a week added to his existing salary.

### National Insurance and Visiting Staffs of Dublin Hospitals.

As the result of negotiations carried on during the last six months by the Standing Committee of the Dublin clinical hospitals, the Insurance Commissioners have issued a new form of agreement to be signed by members of the visiting staffs of the Dublin hospitals, whereby they undertake to sign certificates for insured persons who are for the time being their patients in hospital. This does away with the original difficulty of signing certificates for persons who were the patients of another doctor. Other objectionable features of the original form of agreement have also been omitted, notably the penal clauses, and the doctor is allowed in cases of necessity to arrange that his certificates shall be signed for him by a competent person. Both the consultant doctors of Dublin and the insurance authorities are to be congratulated on having at last arrived at an amicable settlement.

## Scotland.

### Scottish Health Statistics for 1915.

The Registrar-General's report on the vital statistics for Scotland for the year 1915 states that the marriages numbered 36,272, constituting a rate of 7.58 per 1,000, which was higher than that of all the years since 1855 with the exception of the two years 1873 and 1874; but this high marriage-rate lost much of its value when the ages of the brides and bridegrooms were as they were found to be in 1914. In 1914, when the total number of marriages registered was 35,028, there were 6,730 brides under 21 years of age, and of these 11 were only 15 years of age, 102 were only 16, and 542 were 17. In the same year there were 2,286 bridegrooms under 21, including four boys of 16, fifty of 17, and 209 of 18 years. The number of young brides and bridegrooms in each case constituted a record. Unless there has

been a distinct rise in the age at marriage in 1915 the high rate cannot be regarded with equanimity. The birth-rate in Scotland for 1915 was the lowest since 1855; the total number of births registered was 114,181, which was 12,363 less than the average for the preceding ten years, and gave a rate of 23.86 per 1,000. The number of illegitimate births was 7,875, and that was 1,157 less than the mean for the preceding ten years. The death-rate was 17.06, and was higher than that of all previous years as far back as 1855, with the exception of four years, 1875, 1891, 1895, and 1900; the number of deaths registered was 7,341 more than the mean of those of the previous ten years. The infantile mortality of 1915 was 126.5 per 1,000 births; it was higher than that of any year since 1901, and it was 14.9 more than the mean for the preceding ten years. The figures for unvaccinated children in 1915 are not yet available, but there was an increase in 1914 by reason of the conscientious objection of parents. Nearly all these facts are disquieting.

### The Scottish Red Cross Unit in Italy.

Dr. W. E. Thompson, surgeon to the 1st British Red Cross unit sent from Scotland to Italy, gave an address on his year's experiences, at a meeting held in Edinburgh under the auspices of the War Dressings Supply Committee. Professor Bayley Balfour, who presided, said that it was a great tribute to the energy and capacity of Colonel Cathcart that he should have established that large voluntary agency, and that during the past three months no fewer than 150,000 surgical dressings of sphagnum moss had been sent from Edinburgh to various hospitals in this country and abroad. Dr. Thompson said that the sphagnum surgical dressing had given excellent results, and was invaluable to the surgeon, as it possessed all the properties that a surgical dressing should have. The first British hospital unit was sent to the Italian front, he said, in September, 1915; it consisted of about fifty members, and it was at once placed with the Eastern Italian army, the centre of activity on the front. For about three months last winter the motor cars of this unit were almost the only ambulances going up to the important positions at this part of the line, and it was not for nine or ten months that the number of cars was sufficient to do the work properly. Italy, in fact, was not fully prepared for the war; it suffered a shortage of all the equipment necessary for modern warfare. Dr. Thompson paid a warm tribute to the services of the V.A.D.; sixteen of its members had, with the help of four sisters, on a recent occasion dealt with 400 patients who went through the unit in three days. At present there were about six wards which served as a casualty clearing station. The British ambulance unit was the first to enter Gorizia, crossing the one bridge left over the Isonzo under fire. There were now four British units serving in Italy. The total number of patients carried by the cars of the unit was about 45,000.

### Welfare of Mothers and Infants in Glasgow.

The interim report of the Board of Trade Committee on the increase of prices of meat, milk, and bacon since the beginning of the war contained, in addition to the recommendations as to the purchase of meat by the Government and the means of effecting economies in the supply of meat to the army and the advice that summer milk should be imported from Ireland for sale under Government control, a paragraph in regard to infants and children which has not attracted much attention. The Committee recommended that in the present emergency all local authorities should be urged to start a sufficient number of maternity centres, baby clinics, and child nurseries, and should be empowered to provide a certain supply of milk to children under the age of 5, and dinners to expectant and nursing mothers; that doctors in charge of maternity centres, crèches, baby clinics, or nursery schools should be authorized to order milk and dinners for expectant or nursing mothers, for babies that cannot be nursed by the mothers, and for children under the age of 5; and that the cost of milk, as well as that of dinners, to expectant and nursing mothers, if incurred at such institutions on the certificates of duly qualified medical men, should be allowed as part of the expenses towards which special grants are made by the Local Government Board and the Board of Education. The *Glasgow Herald* has recalled the fact that work on the lines now recommended was begun in Glasgow about twelve years ago when milk dépôts were opened. Four years later medical consultation centres for infants were established, and there are now such centres in fourteen areas in the city, in connexion with which two women doctors and ten nurses are working. Valuable aid is rendered by the Glasgow Infant Health Visitors' Association, about 400 members of which give their services voluntarily. The Glasgow Day Nursery Association conducts six day nurseries in various working-class localities, and beds for the treatment of certain infectious diseases are provided by the corporation at a reception house. An extension of the scheme is, it is said, contemplated by the municipal authority to include the care of nursing and expectant mothers. A scheme has been prepared by the medical officer of health and conferences with existing institutions have been held. At present in connexion with the infant consultant centres some expectant and nursing mothers are advised, but the new scheme proposes that antenatal dispensaries should be opened in connexion with existing maternity centres and at such of the infant consultation centres as may be found necessary. Lectures are already given by voluntary agencies on the rearing of children, and the municipal scheme proposes to extend this system.

## India.

### The Effort of India.

Lord Chelmsford, the Viceroy and Governor-General of India, in his speech on September 5th at the opening of the session of the Supreme Legislative Council of India, the first Council over which he has presided, referring to the contribution of India to the war, gave some interesting information which will be new to most people.

On August 1st, 1914, out of 4,958 British officers on the Indian establishment 530 were at home on leave and were detained by the War Office for service in Europe. No fewer than 2,600 combatant officers have been withdrawn from India for service in the war, in addition to those who proceeded on service with their regiments and batteries. The Indian Army Reserve of Officers, which was only forty strong at the beginning of the war, has expanded to over two thousand. The establishment of Indian units has not only been kept up but has been increased by 20 per cent. in the cavalry and 40 per cent. in the infantry. Six new labour corps have been raised and sent to the front. The Royal Indian Marine has contributed 192 British officers and 7,000 Indian seamen and stokers, while 171 vessels have been chartered and fitted up as transports. The Indian Ordnance Department has supplied stores, shells, etc., from the munitions branch to the value of £2,000,000, exclusive of those provided for the different Indian expeditionary forces. Many of the Indian States have contributed troops for service in the war, the Mysore Lancers and the Bikanir Camel Corps in Egypt, the Kashmir Rifles, the Jhind Infantry, and the Faridkot Sappers in East Africa, the Maler Kotla Sappers and the Sirmur Sappers in Mesopotamia, the latter taking part in the defence of Kut. Most of the Indian princes have given very large donations from their private fortunes for war purposes. The Indian railways have contributed 350 officers and 1,500 subordinates to the war. The number of recruits enlisted in the Indian army since the beginning of the war (189,000) is greater than the total strength of that army as it stood in August, 1914, including 39,000 Punjab Musalmans, 28,000 Gurkhas, and 27,000 Sikhs. Over half of the whole enlisted in the Punjab.

As regards the medical department, India has contributed to the war 40 field ambulances, 6 clearing hospitals, 35 stationary hospitals, 18 general hospitals, 9 *x* ray sections, 8 sanitary sections, 7 advanced dépôts, and 1 general medical store dépôt, all of which are now serving overseas. The personnel provided amounts to 258 officers of the R.A.M.C., 704 I.M.S. officers, 475 assistant surgeons, 854 sub-assistant surgeons, 40 lady nurses, 724 British nursing orderlies, 2,843 Indian ranks, and nearly 20,000 Indian followers. In the I.M.S. 344 officers have been withdrawn from civil employment, and some 200 private practitioners and civil assistant surgeons have been given temporary commissions. In one province, Bihar and

Orissa, only three civil surgeons are left. The strain upon the civil medical department caused by these changes and withdrawals has been very great. In the medical department, indeed, the Indian Government, in responding to the demands made upon it, has gone as far as it was possible to go. In the subordinate branch, 205 civil assistant surgeons and 560 sub-assistant surgeons in various kinds of civil employment have been transferred to military duty.

# Correspondence.

## THE CAUSE OF EXOPHTHALMOS IN GRAVES'S DISEASE.

SIR,—In a valuable paper on *post-mortem* findings in a case of exophthalmos of long standing originally due to Graves's disease, which appears in the JOURNAL of October 7th, Captain Mackinnon raises the question of the cause of this striking feature of the disease. Of the various views held on this subject, it has for long seemed to me that the correct one is that which attributes the proptosis to excess of retro-orbital fat. This was clearly illustrated by a case with marked exophthalmos and general emaciation which died while under my care in the Newcastle Royal Infirmary. When the orbits were opened from above large masses of retro-orbital fat were seen which were obviously the cause of the exophthalmos. This local excess of fat formed a striking contrast to the almost complete absence of visible fat in other parts of the body. The fat which was removed from one orbit weighed ½ oz. The optic nerve appeared to be elongated, and measured 1 in. from the optic foramen to the eyeball.

Captain Mackinnon reports in his case that "on removing the orbital plates nothing *unusual* was found. Owing to the protrusion of the eyeballs the retro-orbital space was *abnormally* deep. *This space was filled with fat.*" (The italics are mine.) The condition of the orbits was therefore similar to that which was present in my case. Captain Mackinnon, however, regards the excess of fat as the result and not the cause of the protrusion. It appears to me more rational to regard the fat as the mechanical cause of the exophthalmos.

Some years ago I made a few simple experiments with heads of dead animals, and found that when, after removal of the brain, melted paraffin was injected through the optic foramen into the orbit it was easy to produce any degree of exophthalmos at will. On opening the orbit after the paraffin had set, it was found to fill a similar position to that occupied by the fat in the case of Graves's disease. Once this retro-orbital fat has formed in excess it remains for long, so that, as in Captain Mackinnon's case, we occasionally see patients with persistent exophthalmos after the other symptoms of the malady have disappeared.—I am, etc.,

Manchester, Oct. 9th. GEORGE R. MURRAY.

## ANTE-PARTUM CLINICS.

SIR,—In the correspondence and articles which have appeared on this subject a reader not conversant with the facts might easily get the impression that the Edinburgh Royal Maternity Hospital was the first, if not the only, maternity hospital which has seriously studied the treatment of diseases in the pregnant woman. Sir Francis Champneys, in your issue of September 23rd, very properly points out that "antenatal care" is not a discovery of the twentieth century, but has been practised for a long time by all careful doctors and midwives.

The study of "antenatal pathology," the pathology of the unborn child, owes a great deal to Dr. Ballantyne, but the study and treatment of "diseases of pregnancy" is of much older origin. Certainly in St. Mary's Hospital, Manchester, this branch has been a special feature of the hospital's work for the last 125 years. No special out-patient department or ward is set aside with a special name, as this would mean a great waste of beds and time. Maternity work is always subject to great fluctuations: at one time every bed is occupied, at another a very large number are empty, and to divide the hospital into two parts would often mean that parturient women were turned away while beds were lying empty in the "pregnancy" wards, and vice versa. There is not the slightest objection to the treatment of a pregnant woman in the same ward with puerperal patients, either to herself or the study of her complaint, provided that each ward has some smaller rooms for the isolation of patients who are acutely ill or require a special temperature.

At St. Mary's Hospital no pregnant woman is given a note for attendance at her confinement, either in the hospital or by the nurses on the district, until she has interviewed the resident obstetrical officer, who is always a man with previous obstetrical experience, and usually holds this post for some years preparatory to commencing practice as a consulting obstetrician and gynaecologist. Every primigravida, and every woman with a history of difficulty in a previous confinement, is examined by him, and each case found to have a contracted pelvis or other abnormality is referred by him to the honorary surgeon on duty, who examines her and decides on appropriate treatment. Moreover, every pregnant and puerperal woman is encouraged to come for treatment of any symptoms she may have, her maternity card having a special blank side for prescriptions.

One of the honorary surgeons attends every morning to see both gynaecological and maternity cases—not only those who have maternity notes for the hospital, but also women who have made their own arrangement for the confinement and cases referred to the hospital for advice by outside doctors. Every morning a large number of these patients are seen, their symptoms investigated and treatment adopted, the cases requiring special institutional treatment being admitted to the wards. A large number of cases with urgent symptoms—haemorrhage, eclampsia, etc.—are admitted direct to the wards, without coming to the out-patient departments, doctors sending them down at any time of the day or night. I find from the report for 1914, the last published, that 170 maternity patients were admitted and discharged before delivery, but this only includes a part of the cases treated ante-partum as a large number of patients are delivered in the hospital after prolonged treatment of some ante-partum complaint. For instance, 65 cases of placenta praevia were delivered in the hospital in this year, and some of these were treated in the hospital for a considerable time before delivery. The same thing applies to albuminuria of pregnancy, of which there were 27, and eclampsia, of which there were 45, and many other conditions.

To obtain the very best results all over the country it is not sufficient to have well-equipped and well-staffed maternity hospitals, the general practitioner must have practical training in the whole department of midwifery. Nothing could be worse than the present system of insisting only upon the attendance of twenty cases of labour by the medical student. What is required is that the student shall attend at least this number, but shall also be in residence in a large maternity hospital for a certain period so that he may see all classes of maternity disease and abnormalities of labour which he cannot hope to include in his twenty cases. Manchester University for some years has required its students to reside in a maternity hospital for a month, and its final examination for the M.B., Ch.B. includes a clinical examination on obstetrical and gynaecological cases.

My object in writing is to emphasize Dr. Ballantyne's plea for the examination and treatment of pregnant women, and also to point out that this opinion is not held, or carried out, only in Edinburgh. In Manchester it has been in full operation for 125 years, and I have no doubt it forms one of the most important departments of every well-conducted maternity hospital in the country, though we do not all label it with a new name.—I am, etc.,

Manchester, October 3rd. WM. FLETCHER SHAW.

## PAINLESS MIDWIFERY.

SIR,—I well remember the day when our professor of midwifery began his lecture with a quotation from Genesis iii, 16: "Unto the woman he said, I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children." Because the first woman tempted the first man to eat the forbidden fruit many thought that she and all other women since were condemned to painful childbirth, and it was not for us to interfere in order to relieve it. At one time the majority of doctors held the same view, but great progress has been made since then.

On the question as to how far the accoucheur shall go in rendering the confinement painless, opinion varies greatly in different countries and according to the sensibility of the patients. A woman if she has a small pelvis and a big-headed child can and often does have an absolutely painless delivery by means of a modern Caesarean section, the risk of which is actually less for both mother and child than from a high forceps operation. A woman with a fairly good pelvis can have an almost painless confinement by two or three hypodermic injections of morphine and atropine during the period of dilatation of the os uteri, which diminishes the suffering by two-thirds at least. When the head is near the perineum the woman is put sound asleep with A.C.E. mixture or ether, and delivery then takes place absolutely without pain.

Only the other day an intelligent layman asked me whether it was true that the profession did not look favourably upon painless midwifery. My answer was, Yes and no. We do not look favourably upon its exploitation for purposes of gain by unqualified people, because it requires the very highest degree of skill to make it safe; but a large number of us do believe in it, and have practised it systematically for the last thirty years, the number varying in different countries, but steadily increasing every year in all of them.

Although I have no means of verifying the statement, which is based on observation, conversation, and the study of the literature, I should say that the proportion of women who have anodynes and anaesthetics varies in different countries somewhat as follows: United States 70 per cent., Canada, Australia, and New Zealand 60 per cent., British Isles 50 per cent., France and Belgium 40 per cent., Italy and Spain 30 per cent., Holland, Norway, and Sweden 20 per cent., South America 10 per cent., Russia and Japan 5 per cent.

During the last thirty years I have in every case in which the woman would give her consent used some form of anodyne during a period of twelve to twenty-four hours and anaesthetics during the last half-hour, and I have done my best to induce my pupils and colleagues to adopt this humane course. Some twenty years ago I read a paper before the American Gynecological Society advocating the use of A.C.E. mixture with a scent bottle and sprinkler such as women use for perfuming their handkerchiefs. I pointed out that such a bottle filled with A.C.E. mixture might be safely given to the woman to shake on to her handkerchief during the last hour or two until the os was fully dilated and the head low enough to justify the application of forceps. Hundreds of my former students and many of their friends have adopted the A.C.E. mixture as their one and only anaesthetic for all operations, and especially for the application of forceps, and they offer it freely to all obstetrical cases.

In this direction, at least, I feel that I have done my best for the lessening of human suffering, having lost no opportunity during my professional career of spreading the view that it is one of our greatest privileges to save pain, and that no pain is greater, while it lasts, than the pain of childbirth in a highly educated or highly nervous woman. The need for painless midwifery increases with the degree of cultivation of the nervous system. Experts with the aesthesiometer show that the perception of tactile sense and the impression of pain is very much greater in the highly educated woman than in the female farm labourer.

I have often noticed while on duty at the annual camps of military training that the City regiments, mostly composed of educated men, carried out the orders of the commanding officer in several seconds less time than did the country regiments. For the same reason a much more profound degree of anaesthesia is demanded by the wives of professional men than by women of the uneducated class. But as education extends to all classes, more and more women will feel the necessity for both anodynes and anaesthetics. To carry a baby during nine months under modern conditions is great enough misery to the average woman to satisfy the penalty pronounced upon our first mother without making it more terrible by withholding the means which Providence has given us to produce a painless delivery at the end.

We are constantly asked by the husband whether it is more dangerous for the mother, while the mother asks whether it is more dangerous for the child. To these two questions we can truly answer that the objection is slight, and even trivial, as far as mother and child are concerned.

Of course the forceps will have to be used a little oftener as the highly nervous woman has no abdominal muscles worth speaking of with which to expel the child; while the working-class woman, while having powerful muscles, cannot use them while she is under the influence of hypodermics of morphine. What paralyses the nerves of sensation also unfortunately paralyses the nerves of voluntary movement; and although the involuntary muscle of which the uterus is composed continues like the heart to contract regularly, this of itself is not sufficient in the majority of cases.

As to the kind of anodyne and anaesthetic, for twenty years I gave a hypodermic of morphine gr. ¼ and atropine gr. $\frac{1}{100}$ as soon as I was called, and another four hours later; and sometimes a third four hours after that if the woman complained. Then for a few years I used Dr. Abbot's hypodermic tablets of morphine, hyoscine, and cactine without any bad effects, except that I had a little trouble with the baby's breathing, and also I was unable to judge how long it would take for the os to dilate, so that when I expected it would take six or eight hours more it very often was all over in two. This, however, is an advantage for the mother, although awkward for the doctor. This quickness of dilatation of the os would be a positive advantage for all concerned if a number of patients could be gathered together in a private hospital where there was always a doctor on hand. I have therefore come back to morphine and atropine again without the hyoscine, and am well satisfied.

With regard to the anaesthetic I am greatly in favour of the A.C.E. mixture or pure ether during the last quarter of an hour.—I am, etc.,

London, W., Sept. 25th. A. Lapthorn Smith, M.D.

## THE POSITION OF THE PROFESSION AFTER THE WAR.

Sir,—A number of people are blowing off a great deal of hot air about the new regulations. Is it not rather futile? After all, we are asked to do no more by regulation than we do now as a matter of course—that is, if we have any regard for our patients and ourselves. It is childish to cry out before we are hurt. It is remarkably foolish to make laymen think we are concerned more for our "rights" than we are for our duties. The time to make a fuss will have come when we are asked to give unreasonable service. We shall do it much more effectively if we refrain from wasting our energies by throwing things at an Aunt Sally which is not there.—I am, etc.,

Walsall. Frank G. Layton.

Sir,—I regret if I have unconsciously misrepresented Dr. Pochin. I stated he wanted a new committee. It is not a serious "accusation." Dr. Pochin says he wants an "intelligence department." Very good; it may be useful. Now each department of the Association's activities is managed by a committee, such as finance, ethics, insurance, and journal. It therefore was not a great stretch of imagination to assume that the very important "intelligence department" necessitated another committee. "The department would cost a great deal of money, have a staff, and be presided over by a specialist"; and as "our present officials have quite enough to do . . . and are fully occupied," it follows that the Council could not devote time to check literary output. They co-ordinate and supervise the work of the different committees and report to the Annual Representative Meeting.

"Organizer" objects to bowing to a "strong leader." If we could only discover him, I would readily bow in gratitude. The term I used was "leadership," and I expected this, not from one man, but from the Annual Representative Meeting when in session; from the Council at other times; and from the different committees when dealing with the special matters committed to their care. "Organizer" wants "strong local bodies owning no loyalty but to themselves and their professional interests." It is a selfish programme. Freedom without discipline and order means anarchy. It is the road to ruin. We must have union, which is unattainable without loyalty to one another. How the new local bodies "owning no loyalty but to themselves" could be kept in a federation I do

not quite see, but I do see clearly that we could never beat the Insurance Commissioners without cohesion. But if we have strong local bodies why not capture the Association, which can be done at once if men join, then we have our organization analogous to a federation constructed at once and without any extra cost. It is a very simple plan.

The necessity for central leadership was never more apparent than at present. We have the far-reaching 1917 Regulations before us. The Insurance Acts Committee have given their blessing. They have given "provisional assent." They have done more. "They have *no hesitation* in recommending Panel Committees to agree to the new Regulations," which, they say, "impose nothing that the average practitioner has not always done for his patients" (Secretary's letter, SUPPLEMENT, September 30th). This is the extraordinary view of our guardian committee. There is a complete absence of foresight, and I venture to assert it is the very negation of virile leadership. Nothing so disastrous in its appalling weakness has happened since our collapse in 1912. Perhaps a third of our most manly and independent panel practitioners are away in the trenches and hospitals of two Continents, and the Insurance Acts Committee subserviently submit to the forging of shackles for these brave fellows when they return to practice here. Fortunately, however, many of us at home are awake, and thanks, Sir, to your lucid and brilliant analysis of the "1917 Regulations" many more will be awakened. Every thoughtful man will agree with you when you say, "Under the new Regulations there is nothing to prevent patients habitually demanding specialist treatment, as it will cost them nothing; they may thus put the panel doctor to a great deal of extra trouble." And again: "In short, the Regulation is so worded as to give the Commissioners power to pile up duties on panel practitioners." Of course this is so. The new Regulations are an unknown quantity: no one can at present see where their expansion will end. Is it a subtle conspiracy to force on a National Medical Service? If so indeed, so much the worse for the profession. The profession has reason to feel deeply grateful and indebted to you for your very opportune exposure of these Regulations; and I most ardently hope that the meeting of insurance delegates on October 19th will unanimously say, "We will not have the 1917 Regulations."—I am, etc.,

Portsmouth. DENIS A. SHEAHAN.

## SIR CHARLES BELL.

SIR,—May I be allowed to correct a printer's error in your report of my address at the Middlesex Hospital? Your report says Sir Charles Bell was appointed surgeon to "Haslar Hospital" in 1812. It should have read "the Middlesex Hospital." Sir Charles Bell was appointed surgeon to the Middlesex Hospital in that year, and it was whilst surgeon to the Middlesex that he went out to Brussels in 1815 to help the wounded from Waterloo.—I am, etc.,

London, S.W., Oct. 7th. M. W. RUSSELL.

## THE MODIFIED CIRCULAR AMPUTATION.

SIR,—In the BRITISH MEDICAL JOURNAL for October 7th Colonel J. Lynn Thomas advises the modified circular amputation with lateral incisions. This method was used by the late Sir George H. B. Macleod for forty years, in addition to a rubber tube with gauze, and the results were very satisfactory.—I am, etc.,

Edinburgh, Oct. 9th. J. CRAWFORD RENTON.

# Obituary.

## W. A. MEREDITH, M.B., C.M., F.R.C.S.,

CONSULTING SURGEON TO THE SAMARITAN FREE HOSPITAL, LONDON.

MR. W. A. MEREDITH has, we deeply regret to say, fallen a victim to his anxiety to carry out the regulations as to lighting. He retired some years ago to Norfolk, and resided at Little Massingham Manor, near King's Lynn. On the night of October 5th he was informed that light was visible at the upper part of his house, and he accordingly went up to inspect a skylight, slipped, and fell twenty feet, being instantaneously killed.

William Appleton Meredith was the son of Mr. Samuel Ogden Meredith of Philadelphia, and was born in New York in 1848. Accompanying his father to Europe, he received his education at Boulogne-sur-Mer and University College, London, and studied medicine at the University of Edinburgh, where he attracted the attention of Lord Lister and of Mr. Knowsley Thornton, then his house-surgeon. Mr. Meredith took the diploma of M.R.C.S.Eng. in 1871 and the degrees of M.B., C.M.Edin., a year later. He held the appointments of house-surgeon and resident medical officer to University College Hospital, and served for a time as resident medical officer to the Royal Infirmary, Edinburgh. After assisting Sir J. E. Erichsen in his private work, he served as anaesthetist to that surgeon and to his colleagues, a duty for which he was well qualified. Meredith was elected to an appointment on the surgical staff of the Samaritan Free Hospital in 1877, and remained an active member of the staff of that institution until his retirement in 1908. Meredith was the last of Sir Spencer Wells's assistants. Undoubtedly a high class abdominal surgeon, he did not rush into authorship, but among a few papers of high merit read before societies we may mention his "Points affecting the mortality of abdominal section" (*Medico-Chirurgical Transactions*, vol. lxxii), and perhaps, better still, his eloquent and instructive introduction to a discussion on abdominal surgery held before the Medical Society of London in the session 1890–1, as writings not merely ephemeral but worthy of study in the present day. His results after ovariotomy and hysterectomy were excellent, and he was chiefly known twenty years ago as a great advocate of Lawson Tait's practice of flushing the peritoneal cavity, while he rejected drainage. He objected to several familiar innovations in abdominal surgery, especially to panhysterectomy for uterine fibromyoma where the supravaginal operation appeared to him, as many gynaecologists still maintain, to be the better surgical procedure. In 1886 Mr. Meredith was naturalized a British subject, and in 1897 was elected a Fellow of the Royal College of Surgeons of England.

He married the daughter of Mr. H. Atkinson Green, of Boston, Mass., and their son went to France with the first British Expeditionary Force in August, 1914, and fought on till January, 1915, when he received a wound and returned home.

Mr. Meredith's death is much regretted by his former colleagues at the Samaritan Hospital, to which he was elected consulting surgeon on his retirement in 1908. He was a man of fine physique, strong nerve, and great force of character. He had many friends among the profession in London to whom he was endeared by his genial manner and many sterling qualities.

## ALEXANDER BALLANTYNE, M.D., F.R.C.P.EDIN., J.P.,

DALKEITH.

THE medical profession in and around Edinburgh has always had a warm feeling of friendliness for Dr. Alexander Ballantyne of Dalkeith, who passed away on October 3rd. He had the happy knack of making friends both amongst his patients and his brother practitioners, and the still happier power of keeping his friendships well in repair. His interest in the affairs of others, to the quiet but resolute exclusion of his own, was real and spontaneous; his sympathy was forthcoming as often as it found opportunity, and he could rejoice, too, when there was occasion. To sum up all in a phrase, he could play a losing game at golf without a word of grumbling, and with a delightful readiness to admire sincerely his opponent's strokes. At the same time, he was a fine exponent of that game, and won much oftener than he lost.

He was born at Chorley, in South Lancashire, on July 13th, 1838. Some generations previously the branch of the Ballantynes to which he belonged had migrated to England; but, as he used to say, he narrowly missed being born in Scotland, for his parents moved from Chorley to Dalkeith, near Edinburgh, when he was a baby in arms. His father was a nursery and seedsman by trade. Alexander Ballantyne was the younger of two sons, and since his elder brother went into the business he was able to fulfil his earnest desire to become a doctor. He had his schooling in Dalkeith and his medical education in

Edinburgh University, where he graduated M.D. in 1860. There was no Ettles Scholarship in his day to mark out the "best man of the year," but Dr. Ballantyne had offered to him the residentship at Morningside, and that was in the opinion of many the equivalent of the later distinction. He served a strenuous seven years with Dr. Anderson of Selkirk, then one of the best known practitioners in the south of Scotland. In his Presidential Address to the Edinburgh Obstetrical Society in 1896, Dr. Ballantyne threw an illuminating sidelight upon obstetric practice in the country districts then, telling how, when summoned to a case of labour at a great distance from head quarters, he jumped into the saddle provided with a 6 oz. bottle of chloroform, some ergot, a pair of Simpson's forceps, and a catheter, and felt ready for any of the usual varieties of labour. So great a benefit had chloroform brought to the country doctor in the early Sixties of the past century.

From Selkirk Ballantyne went to Vienna, where he spent more than a year in post-graduate work, and formed one of a little coterie of Britishers there, with each of whom he maintained in after-years a continuous friendship. One of them was Sir Thomas Lauder Brunton, whose recent death was felt with keen regret by Dr. Ballantyne. Ultimately Ballantyne settled in his own town of Dalkeith, taking over the practice of Dr. Bryce, who was then moving into Edinburgh. There for more than forty years he carried on a practice which was by no means confined to Dalkeith, but extended itself several miles around, and did not even halt at the toll gates of Edinburgh. It was not only the medical needs (in the old sense) of Dalkeith to which Alexander Ballantyne attended, for he was fired by the newer notions of prevention, and as medical officer of health he did much to drive epidemics from their hunting grounds in many of the narrow wynds that branch off the High Street of Dalkeith. He had a keen appreciation of music, and, with his wife, had much to do with the foundation of the Dalkeith Philharmonic Society, and was also a director of the Dalkeith Scientific Association; he was surgeon-lieutenant-colonel to the 6th Battalion of the Royal Scots, which, as an old Volunteer regiment, had its station in the town, and he held numerous other appointments, including that of visiting doctor at the Dalkeith Combination Poorhouse; and he was made a Justice of the Peace for Midlothian in 1898. On two occasions his fellow-townsmen and patients made him a presentation, the first being on his and Mrs. Ballantyne's silver wedding in 1893 and the second in 1911, when he retired from practice.

Medical Edinburgh, also, was not unappreciative of the good work which Dr. Ballantyne was carrying on some six miles to the south of it, and the presidentship of the Obstetrical Society and that of the Harveian were two of the honours which served to emphasize the professional esteem in which he was held. He was elected a Fellow of the Royal College of Physicians of Edinburgh in 1877, and at his death he was far up in seniority on the list. He was also an ex-president of the Edinburgh Branch of the British Medical Association. After his retirement in 1911, Dr. Ballantyne resided at Orfordholme, in Gullane, where he was able until a few weeks ago to enjoy to the full his favourite recreation of golfing. During the past fortnight he suffered from attacks of angina pectoris, and the cardiac affection, which he had had for some years without much inconvenience, proved fatal on October 3rd.

Dr. Ballantyne was not often to be tempted to put pen to paper, his modesty preventing him many times; but his two presidential addresses to the Edinburgh Obstetrical Society and his article on a case of tetanus treated by chloral, published in the *Lancet* early in 1870, are well worth perusal.

Dr. Ballantyne is survived by his widow and by two sons, one of whom, Dr. Harold Ballantyne, is his successor in the practice at Dalkeith. His third son, Commander Ernest Ballantyne, went down with his ship, H.M.S. *Viknor*, in the early months of the war. Dr. J. W. Ballantyne of Edinburgh is the son of Dr. Ballantyne's elder brother. The funeral from Gullane to the New Cemetery at Dalkeith took place on Friday, October 6th, and, although the weather was inclement in the extreme, it was attended by many friends both from Edinburgh and Dalkeith, as well as by the Provost, magistrates, and councillors of Dalkeith.

# The Services.

## EXCHANGES.

Major R.A.M.C.(T.F.), sixteen months in France, at present serving with a casualty clearing station, desires to exchange with an officer of similar rank at home. Address No. 4100, British Medical Journal Office, 429, Strand, W.C.

Captain R.A.M.C.(T.) attached to Staff of General Hospital, B.E.F., France, offering ample scope for surgical work, desires exchange with Territorial Officer at home, preferably stationed in or near London, or Eastern Command. Please state full particulars as to unit, station, and duties in confidence to No. 4000, British Medical Journal Office, 429, Strand.

M.O. (Territorial), attached infantry battalion now serving in Ireland, wishes to exchange for foreign service. Address No. 4099, British Medical Journal Office, 429, Strand, W.C.

# Universities and Colleges.

## REVIEW OF EDUCATION COMMITTEE.

The following are the terms of reference to the subcommittee of the Reconstruction Committee, which is to review various aspects of the education problem:

"To consider the system of education as a whole; to review and formulate from that point of view proposals for developing it, particularly in directions indicated as desirable or necessary by experience gained during the war, and with special reference to:

"(*a*) Proposals prepared before the war for the development of the national system of education;

"(*b*) The memoranda already submitted by the Education Departments for the consideration of the Reconstruction Committee;

"(*c*) Any proposals submitted hereafter from the Departments, or from special Committees, or from other responsible organizations;

and to recommend from time to time such action, whether by way of legislation or otherwise, as may be practicable."

The chairman is the Lord President of the Council (the Marquess of Crewe).

## UNIVERSITY OF OXFORD.

### Science and Education.

In convocation at Oxford on October 7th the Dean of Christ Church in beginning his fourth and final year of office as Vice-Chancellor said that 10,500 members of the university were serving with the navy and army and nearly 500 were in Government employment in other ways. There had been awarded to members of the university 9 Victoria Crosses, 120 D.S.O.'s, 267 Military Crosses, 4 Distinguished Conduct Medals, 2 Distinguished Service Crosses, 48 foreign orders, and 700 had been mentioned in dispatches; 1,230 were reported killed and 105 missing.

He then went on to consider the statute concerning the Honour School of Chemistry, which he described as an attempt on the part of the university to meet one of the educational needs the war had brought to notice. The past neglect of the claims of natural science in education must, he said, in some way be remedied. It was not necessary merely to produce more advanced students of natural science, but to ensure that all students should be brought in some degree to understand the scientific point of view. This would not be easy, for it would mean a great psychological change in the nation, which would have to give up its profound distrust of expert knowledge. At the same time he hoped that there would be no attempt to import German methods and German rigidity of type into British education without serious consideration and deliberate criticism. It had also to be remembered that the majority of the men educated at Oxford would be engaged in the work of the empire—that is to say, administration. For such men the knowledge most necessary of all was the knowledge of men.

## UNIVERSITY OF GLASGOW.

The following degrees were conferred on October 9th:

M.B., Ch.B.—*J. Stirling, *J. MacA. Mackintosh, *Helen Y. Murdoch, J. E. Bannen, J. Beveridge, A. G. Brand, H. D. Brown, W. M. Cameron, A. La B. Clark, D. Clyde, Ann K. Cormack, J. Crerar, R. Cunningham, W. Donald, G. M. Hetherington, A. R. Hill, T. J. Honeyman, J. N. Jamieson, S. Johnstone, Margaret J. T. Leitch, H. E. M'Coll, D. B. Robertson, J. Steel, H. W. Torrance, R. N. Walker, A. E. Wilson.

* With commendation.

Mr. E. M'M. Dunlop, now on active service, who graduated on July 19th, 1916, gained the Brunton Memorial Prize of £10, awarded to the most distinguished graduate in medicine of the year.

The Lord Mayor has convened a conference of municipal and hospital authorities, and representatives of religious, educational, and social organizations, at the Mansion House, on October 24th, to consider the steps which should be taken in London to provide facilities for the treatment of venereal diseases in accordance with the recommendations of the Royal Commission.

# Medical News.

At the meeting of the Royal Microscopical Society at 20, Hanover Square, on Wednesday next, at 8 p.m., Mr. H. Pixell Goodrich, D.Sc., and Mr. H. Moseley will read a paper on certain parasites of the mouth in cases of pyorrhoea.

We greatly regret to have to announce the unexpected and almost sudden death of Dr. J. R. Hamilton of Hawick, chairman of the Scottish Committee of the British Medical Association, and until recently a member of the Central Council. We hope to publish a biographical notice in an early issue.

Sir Victor Horsley by his will left property of the value of £35,595, the net personalty being £30,214. He gave his professional furniture, books, and instruments to such of his children as may enter the medical profession, and, if none, then to the Pathological Department of University College. He directed that a *post-mortem* examination of his body should be made by the pathologist of the National Hospital for the Paralysed and Epileptic, Queen Square, and that his brain and skull should be given and preserved by the Neurological Society of London, and gave the remainder of his body to the museum of University College for the preparation of such specimens as the curator might think fit. The pathologist who made the *post-mortem* examination was to be paid 10 guineas.

A series of demonstrations open to medical students and practitioners and to first-aid and ambulance students, will be given at the Royal College of Surgeons of England, Lincoln's Inn Fields, during October. At 5 p.m. on Mondays, October 16th and 23rd, Mr. Shattock will give demonstrations on wounds and their repair, and on Monday, October 30th, at the same hour, on injuries of arteries. Mr. Colyer will demonstrate fractures of the jaw on Wednesdays, October 18th and 25th, at 5.30 p.m., and dental students are specially invited to attend his demonstrations. A first series of a course of lectures on the anatomy of the human body for first-aid and ambulance students will be given by Professor Arthur Keith, F.R.S., conservator of the museum, at 5 p.m. on Mondays, Wednesdays, and Fridays during November, beginning on Wednesday, November 1st. The preparations and specimens used for purposes of illustration will be on exhibition from 3 to 5 p.m. on the day of each lecture, and from 10 to 5 p.m. on the following day.

The members of the National Commission on the Birth-rate, whose report was published last June, had an interview on October 6th at the Deanery of St. Paul's with representatives of the Engli h Plaster Makers' Association on the question of the restriction of the sale of certain forms of lead plaster. It may be remembered that after the collection of a good deal of evidence on the use of diachylon plaster for the production of abortion, the British Medical Association, on March 27th, 1906, addressed a letter to the Lord President of the Privy Council urging that one of the most effective measures for preventing the spread of this evil would be to schedule diachylon as a poison under the Pharmacy Act. The Association submitted the evidence on which it had based this opinion and at the same time issued a letter to the press asking it to publish the fact that the use of diachylon internally resulted in paralysis, blindness, insanity, and death. The Association has now addressed a letter to the Marquess of Crewe expressing the pleasure with which it had noticed the interest shown in this matter by the National Council for Public Morals and other bodies as well as the National Commission on the Birth-rate. In view of the importance of the subject the Association urges that its suggestion to schedule diachylon as a poison should be taken into consideration by the Privy Council at an early date, with a view to the substance being included in the schedule of the Pharmacy Act.

October 12th was the anniversary of the execution of Nurse Edith Cavell by the Germans in Brussels. A scheme to perpetuate her memory by establishing a home of rest for nurses—a plan which she had herself hoped to carry out—has been matured with the approval of her family, and a freehold house, standing in about three and a half acres of ground in a suitable locality, which will deal with the needs of about a hundred nurses yearly, has been offered to her sister as a gift. A committee has been formed to raise a fund sufficient for its permanent endowment. The chairmen of the committee are Sir Richard Temple and Prince Alexander of Teck, and among the members are Sir Havelock Charles, Sir Dyce Duckworth, Sir Douglas Powell, Sir Henry Morris, Sir Frederick Treves, Sir Seymour Sharkey, Sir Cooper Perry, and Sir William Bennett. Contributions, which may be sent to the honorary treasurer, Mr. Charles Campbell McLeod, 10, Lime Street, London, E.C., are invited. A hospital to Nurse Cavell's memory was opened in Paris on October 12th; it contains 100 beds, placed at the disposal of the army. The chief surgeon is Professor Hartmann, and Madame Curie is in charge of the radiographic department. Associated with the hospital is an institution for the training of hospital nurses. On the same day a memorial to Nurse Cavell was unveiled by the Mayor of Shoreditch and the Right Hon. Christopher Addison, M.P., in the nurses' dining-room at Shoreditch Infirmary, where she was at one time assistant matron.

# Letters, Notes, and Answers.

The telegraphic addresses of the British Medical Association and Journal are: (1) EDITOR of the British Medical Journal, *Aitiology Westrand, London*; telephone, 2631, Gerrard. (2) FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London*; telephone, 2630, Gerrard. (3) MEDICAL SECRETARY, *Medisecra Westrand, London*; telephone, 2634, Gerrard. The address of the Irish office of the British Medical Association is 16, South Frederick Street, Dublin.

## QUERIES.

### Income Tax.

1598 is interested in the dissolution and reconstitution of a partnership, and inquires how the tax charged should be divided between the past and present members of the firm.

*** Inasmuch as the persons concerned may be entitled to different allowances and may be liable to tax at different rates, it is unsafe to divide the duty for the year proportionately. The only satisfactory method is to divide the "gross" assessment in that manner, and for the partners to pay their shares on those proportions as reduced by their appropriate allowances. Taking the assessment to be £1,000 and the date of change in the constitution of the partnership to be August 5th, 1916, this division would work out as follows:

A.—$\frac{5}{8}$ of £1,000 ... ... ... £625
B.—$\frac{3}{8}$ of $\frac{4}{12}$ of £1,000 ... ... ... £125
C.—$\frac{3}{8}$ of $\frac{8}{12}$ of £1,000 ... ... ... £250

The surveyor of taxes will probably insist that the assessment itself cannot be divided, but he may be able to assist in the calculation of the respective amounts into which the duty so charged should be divided, a point which is worth bearing in mind, as one partner is not in a position to know whether the allowances have been correctly made for the other persons affected.

### Naevi of the Face.

L. G. N. asks for advice as to the treatment of capillary naevi on an infant's face.

*** The treatment depends upon the size, the shape, and the part attacked. If the naevi are very small, electrolysis or the galvano-cautery are proper methods. If they cover a large area, radium is the best treatment. Ionization is useless.

## LETTERS, NOTES, ETC.

### Importation of Salicylates.

The President of the Board of Trade has given the following statistics for 1913, the only year for which they were available, of the actual declarations of importers showing the amount of salicylates imported in that year:

| | Total Imports. | Imports from Germany. |
|---|---|---|
| Salicylic acid ... ... ... | £10,703 | £10,375 |
| Sodium salicylate ... ... ... | £16,147 | £15,264 |
| Acetyl salicylate ... ... ... | £3,518 | £3,376 |
| Aspirin ... ... ... | £20,096 | £19,974 |

Quantities could only be given in the case of sodium salicylate, of which 2,385 cwt. were declared, including 2,305 cwt. from Germany. Salicylates are not separately recorded in the import statistics; they are entered under the head of "chemicals and drugs unenumerated."


## SCALE OF CHARGES FOR ADVERTISEMENTS IN THE BRITISH MEDICAL JOURNAL.

| | £ s. d. |
|---|---|
| Seven lines and under ... ... ... ... | 0 5 0 |
| Each additional line ... ... ... ... | 0 0 8 |
| A whole column ... ... ... ... ... | 3 10 0 |
| A page ... ... ... ... ... ... | 10 0 0 |

An average line contains six words.

All remittances by Post Office Orders must be made payable to the British Medical Association at the General Post Office, London. No responsibility will be accepted for any such remittance not so safeguarded.

Advertisements should be delivered, addressed to the Manager, 429, Strand, London, not later than the first post on Wednesday morning preceding publication, and, if not paid for at the time, should be accompanied by a reference.

Note.—It is against the rules of the Post Office to receive *poste restante* letters addressed either in initials or numbers.